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Vol. 14. No. 11. pp. 367-406. November, 1944

THE VETERINARY BULLETIN

1944

IMPERIAL BUREAU OF ANIMAL HEALTH
WEYBRIDGE, SURREY
ENGLAND

Price 5/- net

Annual Subscription £2

Imperial Agricultural Bureaux.

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IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 14.] **November, 1944.** [No. 11.

DISEASES CAUSED BY BACTERIA AND FUNGI

MORGAN, G. F. V., & M'KENZIE, D. A. (1943). **The Use of the Resazurin Test as a Rapid Test for the Indication of Mastitis.**—*Proc. Soc. agric. Bact., 1943.* pp. 64–66. **2344**

Results are given of an investigation undertaken in view of the suggestion that the resazurin tests adopted under the National Milk Testing and Advisory Scheme in the United Kingdom may penalize producers, not because of poor keeping quality of the milk, but owing to its high cellular content. Of samples of foremilk taken from 211 cows, 84 had cell counts greater than 1,000,000 per ml. By the one-hour resazurin test conducted within 30 min. of milking, 12 of 19 samples reducing the dye to disc 4 or higher were culturally mastitis positive, while of 65 reducing resazurin to disc $3\frac{1}{2}$ or less, 56 were culturally mastitis positive. On test after storing at atmospheric temperature for 24 hours, only 41 samples reduced resazurin to disc $3\frac{1}{2}$ or less. Bulk samples were taken from the herds from which the individual samples originated and subjected to the one-hour resazurin test. In farm A there were 16 mastitis-positive cows out of 39 in the herd. Samples from this herd gave disc readings of 5, 5, and $4\frac{1}{2}$. Farm B with no mastitis-positive cows gave readings of 0 and $\frac{1}{2}$, while farm C with six mastitis cows in 16, gave readings of 0 and 0. It is suggested that, as a large number of cows with high cell counts are mastitis positive, the one-hour resazurin test on the bulk foremilk of individual cows can be usefully carried out in the cowshed, samples giving disc readings of $3\frac{1}{2}$ or less being regarded as suspicious for mastitis. It is concluded that the reducing activity of cells may still be noted after 24 hours, but that the reducing effect will rarely be sufficient to fail the bulk milk when tested at this age.—H. I. FIELD.

SOARES, F., Filho. (1942). Pesquisa de estreptococos de mastite, em rebanhos leiteiros. **[Mastitis Streptococci in Dairy Herds].**—*Bol. Indústr. anim., S. Paulo.* **5.** No. 4. 190–194. **2345**

An examination of the milk of 159 cows in three dairy herds revealed the presence of *Str. agalactiae* in 18 cases and *Str. uberis* in four cases.

—ISOBEL W. BROCKLEHURST.

FERGUSON, J. (1944). **A Bacteriological Study of the Infections which Follow Injury to the Bovine Udder.**—*Amer. J. vet. Res.* **5.** 87–92. **2346**

Because of the apparent importance of trauma in the establishment of mastitis bacteria in the udder, the incidence of infection in 317 cases of injury to a quarter was studied in detail. Single or, occasionally, repeated samples were taken within a fortnight of injury, and plated on horse-blood agar, for microscopic examination after 24 hours' incubation at 37°C. For purposes of comparison, samples from apparently uninjured quarters of the same cows were also examined (16% infected), and following prior routine examination, results are available from 93 of the affected quarters previous to injury (10% infected).

Of the 317 "injured quarter" samples, 34 remained free from infection; most of the injuries in these cases did not involve the teat meatus: in about half the samples the cell content of the milk was excessive and the milk was abnormal in appearance. In the remaining 283 "injured quarter" samples (89%), infection supervened. A majority of samples from these quarters appeared abnormal macroscopically and in a like proportion there were more than 20 million cells per ml. The infecting organisms fell into seven groups, *viz*, *Streptococcus agalactiae*, *Str. dysgalactiae*, *Str. uberis*, other streptococci, staphylococci, *Corynebacterium pyogenes*, and coliform organisms. It is concluded that injury to the teat meatus readily favours the establishment of infection, and that any of the types of organism associated with clinical mastitis may be established in the udder through trauma. Analysis of the results showed that in herds known to carry *Str. agalactiae* infection, this organism did not necessarily establish itself following injury to a quarter.—F. L. M. DAWSON.

*BOUTET, P. (1942). La streptococcie du porc. **[Streptococci of the Pig].**—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 61]. **2347**

A review of the literature together with a small amount of original work. All pathogenic stains are grouped as *Streptococcus suis*; acute, sub-acute, and chronic lesions in the piglet and sow are described. Infection tends to appear in breeding sows and to spread to the newborn stock. Treatment is often ineffective owing to the delay in diagnosis; sulphonamides are advocated. As prophylactic measures, the use is advised of autogenous vaccines alone for the pregnant sow, and together with hyperimmune serum for newborn piglets.—F. L. M. DAWSON.

FOLEY, E. J. (1944). **Observations on Immunity in Streptococcal Lymphadenitis of the Guinea-Pig.**—*J. Immunol.* **48.** 185–189. **2348**

G. pigs infected with group C streptococci develop, sometimes within five days, an allergic response to subsequent injections of homologous strains, so that lesions arising from intracutaneous reinfection develop and regress at an accelerated rate. G. pigs which were reinfected six days after the first infection, developed, besides a severe response at the point of inoculation, lesions of the regional lymph nodes, but animals infected three weeks or more before reinfection showed the local reaction only. These findings are compatible with the concept that allergic cutaneous reactivity may be the

first manifestation of the development of general immunity, and are probably related to the fact that circulating antibodies appear at about the 12th day. Repeated injections of killed streptococci produced a slight cutaneous sensitivity to streptococcal extracts, but little or no immunity resulted.—E. Cotchin.

Lebowich, R. J. McKillip, B. G., & Conboy, J. R. (1943). **Cutaneous Anthrax. A Pathologic Study with Clinical Correlation.**—*Amer. J. clin. Path.* **13.** 505–515. **2349**

This is mainly an account of the gross and microscopic features of cutaneous lesions of anthrax excised from three patients employed in tanneries. The clinical diagnosis was established by films, cultures and g. pig inoculation. Removal of the carbuncles was immediately followed by administration of anthrax antiserum; there were no ill effects. The lesions showed an acute sero-haemorrhagic inflammation with multiple areas of coagulative necrosis. The epithelium at the site of the central eschar was destroyed and the ulcerated surface was covered with necrotic tissue extremely rich in bacilli. The lymphatics of the corium were dilated but were free from thrombosis. Anthrax bacilli were present in the corium and, in small numbers, in the subcutaneous tissue. The organisms were not found in the underlying voluntary muscle, and were not detected within the lumina of blood or lymph vessels. There were degenerative changes in the medullated and non-medullated nerve fibres of the corium and it is suggested that this may explain the absence of pain in all three patients. There was no evidence of phagocytosis of the organisms by polymorphonuclear leucocytes (the predominant inflammatory cell) or by macrophages.

Four rabbits were inoculated subcutaneously with a culture of *Bacillus anthracis* in its rough phase. The animals died 3–4 days later and the local anthrax lesion was excised and examined histologically. There was no sign of phagocytosis, and oedema was more severe than in the human lesions: in other respects the changes were similar.

The characteristic clinical picture of an anthrax skin lesion in man is a central, depressed, brownish-black, necrotic eschar surrounded by multiple pinkish vesicles lying in a wide zone of oedema. True pain is absent: this is an important diagnostic feature. Regional lymphangitis and lymphadenitis is uncommon. Freedom of the underlying muscle from invasion may be due to the low oxygen tension in this tissue. The main factor responsible for localization of the lesion is probably the barrier of coagulated plasma with its network of fibrin. Lymphatic thrombosis does not seem to be a factor in preventing extension of the infection. There was no evidence of clumping of the bacilli in the lesions, suggesting that local agglutination is also not an important factor.—E. G. White.

Stein, C. D. (1944). **Differentiation of Bacillus Anthracis from Nonpathogenic Aërobic Spore-Forming Bacilli.**—*Amer. J. vet. Res.* **5.** 38–54. **2350**

This is a study of the morphology, cultural characteristics, biochemical reactions, and pathology of *Bacillus anthracis* and of a number of allied bacilli. Fifty-three strains of *B. anthracis* and 64 strains of various aerobic, spore-bearing, anthrax-like organisms were examined. The paper is well illustrated with photographs and photomicrographs of colonies and colony margins and results are summarized in tabular form and discussed. Tests for motility, reduction of methylene blue, haemolysis, fermentation of salicin, rapidity of gelatin liquefaction, action on litmus milk and colony characteristics, when considered as a whole, were found greatly to assist in the differentiation of *B. anthracis* from the other organisms, but pathogenicity constituted the principal point of difference, and it is recommended that this test be applied when any doubt exists.—T. M. Docker.

Zeissig, A. (1943). **The Results of Retests on Tuberculin Reactors.**—*Cornell Vet.* **33.** 17–26. **2351**

The work was undertaken in an endeavour to reduce the number of the no-visible-lesion reactors to tuberculin. Purified protein derivative tuberculin (P.P.D.) was used in place of the standard tuberculin issued by the U.S.A. Bureau of Animal Industry.

Injections were made intradermally into the caudal fold and vulva and were read at the 72nd hour. Reactors were consigned to an abattoir under Federal meat inspection. Sections from all lesions were prepared, doubtful lesions being included. Animals were considered as tuberculous only when the diagnosis was corroborated by microscopic findings.

In judging the results consideration had to be given to the interval elapsing between the original test and the retest and to the fact that some animals were found to have been subjected to a short subcutaneous test often carried out after a suspicious intradermal reaction. It was thought that the reaction was weakened by these previous injections and the animals were considered as "plugged"—47 animals were in this group.

Twenty-seven of 42 animals which reacted to the subcutaneous test showed no tuberculous lesions. Skin, or more correctly subcutaneous, lesions were found in eight animals of this group. It was found that generally speaking the larger the size of the reactor group the greater the probability of TB. being found. In herds where there was only one reactor, 77·7% of these were no-visible-lesion cases. Two-cow (reactor) groups had 80% no-visible-lesion cases. In two 16-cow groups 25% belonged to this class.

A considerable number of animals which reacted on retest did not show gross P.M. evidence of TB. These may have been true no-visible-lesion cases, or may have represented the sensitization due to tuberculin, still present at the time of retest; the reaction may also have been due to some agent other than the tubercle bacillus.

If, on retest, a group of reactors shows positive reactions again, the entire group should be regarded as tuberculous. Lesions, especially doubtful ones, should be examined histologically. P.M. findings, both gross and microscopic, should be taken into consideration in deciding the status of a herd.

It was concluded that where the number of reactors is small, the reactors when retested usually prove negative.—H. E. Bywater.

McIntosh, R. A. (1943). **A Report of an Outbreak of Avian Tuberculosis in Swine.**—*Rep. Ont. vet. Coll., 1942.* pp. 39–44. **2352**

Following the demonstration of avian TB. in a six-months-old pig, a herd of 164 pigs was subjected to the intradermal tuberculin test with avian tuberculin. Fifty-three were positive and four doubtful. These were all slaughtered with the exception of two sows. Re-test about six weeks later revealed only these two sows as positive. Autopsy showed visible lesions in all but nine of the reactors, and in one of the doubtful reactors.—D. D. Ogilvie.

Marcenac, M. (1943). Ostéopathie tuberculeuse close du chat; dermatose fibro-lardacée concomitante. **[Bone TB. in the Cat: Concomitant Fibro-Lardaceous Dermatitis].**—*Rec. Méd. vét.* **119.** 97–101. **2353**

A rare form of TB. in the cat is described, associated with a "closed" tuberculous osteitis affecting the

articulations, epiphyses, and diaphyses of bones, accompanied by non-ulcerating skin lesions generally affecting the face. These " closed " tuberculous lesions tend to progress in a rather leisurely manner, so that they do not become " open " for a long time. M. saw four cases in 18 months, with lesions of the face, limbs, and vertebrae, particularly of the tail. When presented for examination, the cats were in good condition, but showed great deformity from thickening of the skin due to increase of fibro-fatty tissue in the affected areas. The thickened skin was closely adherent to the underlying structures. In profile, the face rather resembled a parrot's beak; the eyes were partly closed, and the third eyelid was protruded half-way across the eye. Tuberculin tests were positive in these cases, but macroscopic visceral lesions were seen in one case only. The syndrome differs from that of acropachia, in the presence of skin lesions, and in that the non-inflammatory bone lesions do not involve the joints.—E. C.

*Diehl, K. (1942). Tierexperimentelle Erbforschung bei der Tuberkulose. [**Research on Inheritance of TB. in Rabbits**].—*Forsch. Fortschr. dtsch. Wiss.* **18.** 179–181. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 413]. **2354**

In investigations on individual resistance to the injection of tubercle bacilli, identical doses of bovine type bacilli were inoculated intravenously into litters of rabbits kept under identical conditions. It was found that the subsequent life of the sibs varied from 110–181 days. Most animals developed pulmonary TB., but in a few peripheral TB. of brain or genital organs developed. The tendency of TB. to develop in these organs, or in the lungs, was found to be hereditary and was demonstrated in four generations.—D. L. Roberts.

Magalhães, E. de A. (1943). Um novo antígeno da tuberculose. [**A New Antigen for TB.**]—*Folha Med.* **24.** No. 6. 58–60. **2355**

M. describes a new vaccine prepared from the granular form of the tubercle bacillus, to which he has given the name M.B. (Magalhães Bruno) micrococcus. He claims that the lipoid content is sufficient to stimulate the allergic state, but that the organism is not virulent in the granular stage. The vaccine is said to have strong prophylactic and curative values in artificially infected g. pigs.—I. W. Brocklehurst.

Chaminaud, C. G. (1941). La vacuna japonesa antituberculosa A-O, preventiva, curativa y diagnóstica. Su valor, sus fundamentos. [**Japanese A-O Anti-TB. Vaccine: Its Value in Prevention, Treatment, and Diagnosis**].—*Sem. méd., B. Aires.* **48.** No. 6. 334–341. **2356**

A-O vaccine, which by the middle of 1940 had already been used on at least 3,000,000 people, is stated to stimulate an effective immunity to TB., and at the same time, to be useful as a diagnostic and curative agent.

The vaccine, which is sterile and non-pathogenic, is prepared from several strains of highly virulent human type tubercle bacilli, on the principle that the higher the virulence, the greater will be the immunizing power. The bacilli are rendered powerless to multiply within the human body, by storage in physiological saline, in the refrigerator, for four years. To conform with Japanese government regulations, an antiseptic, devoid of action on the bacterial protoplasm, is used.

The waxy covering of the bacteria, which plays no part in immunization, must be removed in order to render the vaccine absorbable. This is done by growing the organism in media containing saponin, followed by treatment with lipase. After this treatment, the bacilli are nearly deprived of their waxy covering, but apart from some autolysis their protoplasm is intact.

A-O vaccine does not contain allergens, and therefore does not cause disagreeable secondary reactions. It is stated that an allergic reaction is not necessary for the development of immunity and that the tubercle bacillus allergen is non-protein and is not related to the immunizing agent, which is of a protein nature. It is claimed that the vaccine confers useful immunity.

Diagnosis by means of the vaccine is based on lowering of the leucocyte count, following injection. —I. W. Brocklehurst.

Auerbach, O. (1944). **Acute Generalized Miliary Tuberculosis.**—*Amer. J. Path.* **20.** 121–136. **2357**

Among a series of 1,656 consecutive autopsies on tuberculous persons at Sea View Hospital, Staten Island, N.Y., there were 297 cases of acute generalized miliary TB. In 199 of these the miliary dissemination was accompanied by varying degrees of chronic pulmonary TB. This is in striking contrast to the views of most authors, for it is generally held that the presence of extensive chronic TB. of the lungs excludes the development of acute miliary TB. A. suggests that others have interpreted the miliary foci in the lungs in such cases as representing bronchogenic spread and miliary lesions in other organs as terminal haematogenous lesions.

Reasons are advanced for the view that miliary dissemination occurs by spread of tubercle bacilli from caseous lymph nodes to the lymph vessels and thence into the venous circulation, rather than by direct entry into the arterial circulation by penetration of blood vessels.

Radiographs taken at frequent intervals during the course of the disease, correlated with subsequent autopsy, showed that haematogenous dissemination of tubercle bacilli sufficient to produce generalized miliary TB. is not invariably fatal. Some or all of the seedings may resolve: stages in the process of resolution were demonstrated both in radiographs and histologically.

There are unfortunately no illustrations to the article.—E. G. White.

Laporte, R. (1943). Sur la rapidité de dispersion dans l'organisme des bacilles tuberculeux introduits dans le peau. [**The Rapidity of Dispersion in the Body of Tubercle Bacilli Introduced into the Skin**].—*Ann. Inst. Pasteur.* **69.** 59–61. **2358**

Four g. pigs were each given intradermally 1 mg. of bovine type tubercle bacilli suspended in normal saline. After 30 sec., or in some cases 5 min., electrocoagulation was applied to an area 15 mm. in diameter around the point of inoculation. The animals died of TB. 8–12 weeks later. A fifth animal was given the electro-coagulation treatment 2–3 sec. after inoculation of the bacilli, followed by washing with liquor ferri perchloridi of the sloughed area and, it is stated, of the regional lymph nodes. Death from TB. occurred after eight weeks. In two further animals the washing was repeated a second time, in case the tubercle bacilli had not been destroyed but merely blocked by the first treatment. Both animals died from TB.

It is concluded that the passage of tubercle bacilli from the skin into the lymphatic system takes place immediately upon inoculation.—G. J.

Steiner, P. E., Stanger, D. W., Bolyard, M., & Marcovich, A. W. (1944). **The Quantity of Focal (Tubercle) Calcium in Human Lungs.**—*Amer. Rev. Tuberc.* **49.** 129–139. [Spanish summary]. **2359**

A series of 119 pairs of human lungs (from 46 newborn infants, one child aged six years, 72 adults), taken at random but excluding active pulmonary TB.,

were examined for calcified foci by fixation in alcohol, digestion with caustic potash, and weighing of the freed calcium concretions after washing and drying.

As was expected, no concretions were found in the lungs of the newborn children or in those of the child of six. Foci were found in 64 of the 72 pairs of lungs from adults. The average amount of "calcium" was 0·231 g. The incidence and amount increased sharply between the 30th and 59th years.

It is considered that the majority of these foci represent calcified tubercles (previous morphological studies, radiographs, tuberculin tests) and the authors go as far as to suggest that the method may be useful for P.M. surveys of the incidence of tuberculous infection. In a series of 50 cases the chemical method was compared with radiographs. In 39 cases there was agreement, while in the remainder calcified foci were recovered chemically but were not revealed by X-rays. The striking correlation is illustrated in six cases in which both the radiographs and the isolated concretions are shown.—E. G. White.

Torkildsen, A. (1943). **Intracranial Erysipeloid (Swine Erysipelas) Abscess. A Variety of Abscess not hitherto observed.**—*Acta chir. scand.* **89.** 89–96. [In English]. [Abst. from abst. in *Bull. Hyg., Lond.* **18.** 1013]. **2360**

Localized superficial infections with *Erysipelothrix rhusiopathiae* in human beings are spoken of as "erysipeloid". The condition may occur in persons who deal with live or dead animals. 282 cases were treated at the live or dead animals. 282 cases were treated at the Marie Hospital, Stockholm, during 1921–1930; during 1919–1927, 261 cases were dealt with at the Dermatological Hospital in Berlin; in America details of over 1,000 cases have been collected in a ten-year period.

T. describes infection with this organism in a veterinary surgeon. Illness was acute and febrile; after six weeks he resumed work, but a fortnight later developed hemiparesis which became permanent. An operation was performed on account of evidence of intracranial complications, and a subdural extra-arachnoid abscess was found, the organism being present in the pus. No evidence was available as to the portal of entry.

Lesbouyries, G. (1943). Listeriose du lapin. **[Listeria Infection in the Rabbit].**—*Rec. Méd. vét.* **119.** 145–150. **2361**

The literature on listeria infection of the rabbit is briefly reviewed; L. states that Hülphers described the disease in rabbits in 1911, and demonstrated in the lesions the organism now known as *Listeria*.

Symptoms appear usually in the autumn among rabbits at least three months old; the animals rapidly become emaciated, develop convulsions, and die within a few days. At autopsy there is passive congestion of all tissues and the skin is greenish, apart from any putrefaction. Subcutaneous oedema is frequent. Serous cavities contain an abnormal amount of fluid and there is oedema of serous membranes, lungs, and lymph nodes. Ecchymoses of the heart muscle and congested liver, with some necrosis, are also observed. The spleen is atrophied. Sometimes only the central nervous system is affected (encephalitis, meningitis, etc.). The organism exists saprophytically on the conjunctiva of healthy rabbits; according to Traub [*V. B.* **13.** 5.] it may gain access through the ear.

—C. V. Watkins.

Meyer, K. F., Holdenried, R., Burroughs, A. L., & Jawetz, E. (1943). **Sylvatic Plague Studies. IV. Inapparent, Latent Sylvatic Plague in Ground Squirrels in Central California.**—*J. infect. Dis.* **73.** 144–157. [For previous parts, see *V. B.* **14.** 4]. **2362**

Plague survey crews arriving in an area when an epizootic of sylvatic plague was in progress usually had no difficulty in isolating *Pasteurella pestis* from the carcasses of ground squirrels in which lesions were present.

Epizootics were found to correspond with the emergence of the young rodent population in late April and early May. Later in the season visibly infected squirrels were seldom detected. In the past three years population studies of the ground squirrel (*Citellus beecheyi*) have been conducted in the Calaveras Reservoir area of California. A reduction in the rodent population early in June 1942 was associated with *Past. pestis* infection.

Animals were trapped and fleas removed: nearly half were found to be *Diamanus montanus*; *Hoplopsyllus anomalus* was also found. The fleas were divided into 11 pools which, after trituration, were inoculated into g. pigs. Eight of the 11 produced typical plague infection.

Unsuccessful attempts were made to produce evidence of an active epizootic. Over a period of four months, 16% of pooled pulped organs from shot squirrels induced plague in g. pigs. Material from pooled fleas or pulped organs obtained over the subsequent period July to December failed to produce lesions in g. pigs.

The evidence suggests that material from squirrels with no clinical signs of plague infection may yet prove highly fatal for g. pigs, which makes it doubtful whether the measures at present in force for the suppression of sylvatic plague in California are efficacious.

—J. M. Peters.

Jawetz, E., & Meyer, K. F. (1943). **Avirulent Strains of *Pasteurella pestis*.**—*J. infect. Dis.* **73.** 124–143. **2363**

From several virulent strains of *Past. pestis*, avirulent variants were isolated by:—(a) growing the organism for long periods of time in alcohol-broth at a high temperature; (b) picking single colonies from refrigerated cultures, and (c) modification by passage through immune animals. Tests for harmlessness and immunogenic power were made in g. pigs, white mice, and, in a few experiments, in ground squirrels. The cultural, morphological, and serological properties of the isolated strains were also examined.

By picking off colonies, avirulent strains were found which were safe and stable, although their immunogenic properties varied for g. pigs and mice. 100–10,000 organisms of all live strains conferred immunity on g. pigs, but only one of these strains conferred immunity on mice. A killed preparation which was similarly tested protected mice and not g. pigs.—J. M. Peters.

*Schmidt, H. W. (1942). Die Tularämie als Zoonose von praktischer Bedeutung. **[Tularaemia as an Epizootic of Practical Importance].**—*Med. Klinik.* pp. 708–709. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **143.** 267]. **2364**

Tularaemia is of special significance amongst the contagious diseases of wild animals since it is transmissible to man, serious and fatal infection often occurring. It is present in Wartheland [Poland]. The infection can be transmitted to man by direct contact with hares, wild rabbits, squirrels, mice, rats, water rats, hamsters etc., and also by cats, sheep, and several species of birds, as well as by the bites of different kinds of arthropods including tabanids, ticks, fleas, lice, and bugs. Hunters, shepherds, and gamekeepers

frequently become infected in this manner, but it is denied that infection takes place from man to man. In man there are distinguished ulcero-glandular, glandular, ocular-glandular, and typhoid forms of the disease. In the ocular-glandular type the causal agent penetrates the eye and this appears to be the most serious form. Treatment is symptomatic. Vaccine therapy is used, and intravenous prontosil, trypaflavine, or "causyt" may be used to shorten the course of the disease. S. discusses prophylaxis, emphasizing the importance of control of the carrier animals to the extent to which this is possible. The end of an epidemic often follows a change in the weather, which may be a seasonal change. —T. E. GIBSON.

DAVIS, G. E. (1943). **Further Attempts to Transmit *Pasteurella tularensis* by the Bedbug (*Cimex lectularius*).**—*J. Parasit.* **29.** 395–396. **2365**

D. considers that earlier work, in which it was claimed that infected bedbugs (*Cimex lectularius*) could transmit tularaemia by means of their bite, was inaccurate. The possibility existed that, in experiments previously carried out, contaminated bug faeces were merely transmitted mechanically. In the work now described, the bugs were fed on infected g. pigs on an enclosed area of clean skin. Immediately after engorgement, a suspension of crushed bugs was shown to be infective when injected into fresh g. pigs, but their bites were not shown to be a means of transmitting the infection. The faeces of infected bugs may be a route of spread. D. failed to confirm that *Past. tularensis* could be transmitted through the ovaries of infected female bedbugs to their progeny.—J. KEPPIE.

FOOTE, H. B., JELLISON, W. L., STEINHAUS, E. A., & KOHLS, G. M. (1943). **Effect of Chlorination on *Pasteurella tularensis* in Aqueous Suspension.**—*J. Amer. Wat. Wks Ass.* **35.** 902–910. [Abst. in *Bull. Hyg., Lond.* **18.** 1023, copied *verbatim*. Signed: E. WINDLE TAYLOR]. **2366**

There are several authentic reports that the causative organism of tularaemia has been found in natural waters. First there was an apparent waterborne epidemic in Russia in 1935 and in 1936 there was a similar experience in Turkey.

No evidence of human infection attributable to infected water has been forthcoming either in Great Britain or in the United States, but infection of streams has been reported in the latter country in Montana, and the origin of the infection appears to be the beavers and musk rats that frequent the streams. The present report is an experimental study of the effect of chlorination of water contaminated with *Bact. tularense*.

Considerable variation was found in the resistance of the organism to chlorine from one experiment to another. Laboratory experiments with distilled water showed that twenty minutes' contact was required to destroy the organism with a dose of chlorine sufficient to produce a residuum of 0·4 parts per million. In natural water, however, a residuum of 1·0 p.p.m. had to be maintained for a contact period of 15 minutes.

DAVIDSON, W. A., & BRODIE, J. (1944). **Observations on an Epidemic of Paratyphoid Fever in Dundee, 1941.**—*J. Hyg., Camb.* **43.** 219–228. **2367**

The authors give an account of an epidemic of paratyphoid B fever. For the isolation of salmonella from urine, direct plating on to brilliant green eosin [B.G.E.] agar was employed, while Teague's fluid, tetrathionate broth and B.G.E. agar plates were used for the culture of faeces. The authors found that incubation of B.G.E. agar plates for 16 hours was preferable to 24 hours for the inhibition of *Bacterium coli* in the bacteriological examination of faeces for salmonella. They also demonstrated that a variety of salmonella species can be recovered from the faeces of apparently healthy people.

In the examination of sera for antibodies, the response to somatic antigens was poor and the demonstration of flagellar antibodies was far more reliable for diagnostic purposes.—ANTHONY BUXTON.

GLOVER, J. S., & CONNELL, R. (1943). **Studies in Pullorum Disease.**—*Rep. Ont. vet. Coll., 1942.* pp. 19–28. **2368**

Studies of pullorum disease indicate that in Ontario the disease is widespread, is increasing in incidence, causes a high mortality, and that the strains of *Salmonella pullorum* involved vary in virulence. The comparative pathogenicity of 45 cultures were studied by inoculation of two-day-old chicks. The mortality varied from 23–100%. Cross-agglutination tests showed that several strains were unsatisfactory as antigens.

In answer to a questionnaire to which 137 poultry owners replied, it was ascertained that the mortality among 45,292 chicks on their premises was approximately 31%.—D. D. OGILVIE.

EDWARDS, P. R., CHERRY, W. B., & BRUNER, D. W. (1943). **Further Studies on Coliform Bacteria Serologically Related to the Genus Salmonella.**—*J. infect. Dis.* **73.** 229–238. **2369**

In a study of the biochemical and serological properties of 44 late-lactose-fermenting and gelatin-liquefying cultures of atypical *Bacterium coli* strains, isolated from birds, reptiles, pigs, g. pigs, and man, all the strains were shown to possess H antigens related to those of recognized salmonella types and some to possess in addition salmonella O antigens. Antigenic analysis separated the strains into 14 types. Although their serological characters suggested that they belonged to the salmonella group, the biochemical properties of these strains, *e.g.* failure to ferment tartrates and dulcitol, were more characteristic of paracolon bacilli. Serological and epidemiological data correlated to indicate that the strains investigated were primary agents of animal disease.—R. O. MUIR.

MCGILVRAY, C. D., & GLOVER, J. S. (1943). **Progress Report on Plans for the Control of Bang's Disease.**—*Rep. Ont. vet. Coll., 1942.* pp. 16–18. **2370**

Three plans for the control of brucellosis are in operation, *viz*, routine testing of individual herds, supervised testing of herds in prescribed areas, and supervised calfhood vaccination. Since 1938, under the routine testing plan, 161,221 animals have been tested; of these 82% were negative, 13% were positive and 5% doubtful. Under the prescribed areas plan in which all animals in an area are tested, ten prescribed areas containing 727 herds and 11,301 cattle have been established. In these areas, tests have shown only 3% reactors and 4% doubtful reactors. Under the calfhood vaccination plan, 17,500 calves in 1,475 herds have been inoculated with strain 19 vaccine. Check tests are made after 30 days to show that the vaccine has produced positive results. Less than 5% remain negative or doubtful; these are revaccinated.—D. D. OGILVIE.

PURRIEL, P., RISSO, R., & ESPASANDIN, J. (1942). Investigaciones sobre brucellosis. [**Studies in Brucellosis in Uruguay**].—*Arch. urug. Med.* **20.** 5–12. **2371**

Agglutination tests were made at a meat-packing plant on slaughter animals from various districts. Of 3,500 cattle tested, 7·8% of fat cattle, 2·5% of stores, and 1·44% of calves gave positive reactions. 1,566 steers, 588 pigs, and 371 birds (turkeys and chickens) all gave negative reactions. Intradermal tests with Tortorella's antigen were made on the personnel of the meat-packing plant; there were 163 (19%) positive reactors among 846 persons tested. The aggln. test

was carried out on 71 of these positive reactors, only 20 reacting at a titre of 1 : 50 or over. The relative values of the intradermal and aggln. tests are discussed, and it is suggested that the relatively small percentage of reactors obtained in the animals tested as compared with that in the human beings may be accounted for by the fact that the aggln. test used for the former is less efficient than the intradermal test as used on human beings.—G. J.

IRIBARREN, R. R., VOGELSANG, G., & GALLO, P. (1943). Estado actual de la brucelosis en Venezuela. **[Brucellosis in Venezuela].**—*Bol. Ofic. sanit. panamer.* **22.** 615–618. **2372**

A brief review is given of the history of the diagnosis of brucellosis in Venezuela since 1898, the earlier details being naturally based upon clinical observation. In 1940, *Brucella abortus* was isolated for the first time from a human case in Venezuela. Infection exists in cattle throughout the country; the incidence was 25–46% among 462 animals examined by the agglutination test in the area around Caracas. *Br. melitensis* was isolated from three goats imported from the Canary Islands, but it has not been isolated from Venezuelan herds.

It is considered that the high incidence of infection in cattle is due to the importation of infected animals, and possibly also to the use of a live vaccine in some areas. The incidence of infection in human beings in the country appears to be low. Control measures are briefly discussed.—G. J.

MIGNOT, A. (1940). La route moutonnière soudano-algérienne (voie d'apport possible de la mélitococcie dans l'Extrême-Sud algérien). **[The Sudan-Algerian Sheep Route as a Possible Means of Transmission of *Brucella melitensis* in the Extreme South of Algeria].**—*Arch. Inst. Pasteur Algér.* **18.** 352–357. **2373**

Following a report made in 1938 of the existence of *Br. melitensis* in the area around Gao in the French Sudan, M. draws attention to the possible danger of the infection being carried into the south of Algeria. 15,000–20,000 sheep are driven annually by nomads over a relatively little-known route from the French Sudan *via* Touat into Tidekelt and the extreme south of Algeria. Here the sheep are sold, and remain as a possible source of brucella infection.—G. J.

MUTH, O. H. (1944). **Control of Pulpy Kidney Disease (Entero-Toxemia) of Lambs.**—*J. Amer. vet. med. Ass.* **104.** 144–147. **2374**

A short description of the disease is followed by details of the methods used to prepare antiserum. In field trials with the antiserum, of 617 lambs inoculated two died and of 643 controls 28 died.—D. W. MENZIES.

BRITTON, J. W., & CAMERON, H. S. (1944). **So-Called Enterotoxemia of Lambs in California.**—*Cornell Vet.* **34.** 19–30. **2375**

The authors state that the literature on so-called "infectious enterotoxemia", together with their experience in ten outbreaks in California, reveals the need for more definite knowledge of the aetiology of the disease. The following tentative conclusions are drawn :– (1) the theory that it is due to absorption of the toxin of *Cl. welchii*, Type D, is inadequate; (2) apparently the chief aetiological factor in these outbreaks (characterized by sudden onset and high mortality in lambs) lies in the quantity and quality of the ration; (3) the mechanism in fatal cases appears closely similar to that operating in "inhibitory ileus" in human beings.
—D. W. MENZIES.

NAGLER, F. P. O. (1944). **Bacteriological Diagnosis of Gas Gangrene due to *Clostridium oedematiens*. [Correspondence].**—*Nature, Lond.* **153.** 496. **2376**

A medium is described which quickly reveals the presence of colonies of *Cl. oedematiens*. A product, referred to as V.F. agar (2·25%), is enriched with 10% defibrinated sheep's blood and 10% egg-yolk suspension. The egg-yolk suspension consists of equal parts of normal saline and egg-yolk freshly removed aseptically from the egg. Colonies of *Cl. oedematiens* Type A grow rapidly and after overnight incubation they can be differentiated from those of other species by two characteristic features, *viz*, the surface of the colony and the adjacent medium is covered by a film with a mother-of-pearl lustre, and each colony is surrounded by a halo which appears by transmitted light to be dark red in colour. No other anaerobe or aerobe so far tested has on this medium produced this combination of reactions.—J. KEPPIE.

KEPPIE, J., & ROBERTSON, M. (1944). **The in-vitro Toxigenicity and other Characters of Strains of *Cl. welchii* Type A from Various Sources.**—*J. Path. Bact.* **56.** 123–132. **2377**

In this communication, the authors report the re-examination [see also *V. B.* **12.** 592.] of the toxigenic capacity of a number of strains of *Clostridium welchii* Type A; a new series was also examined. The following strain characteristics were studied, *viz*, production of α-toxin, antitoxin-combining value of the toxin, and the appearance of the capsule. The toxin production of each strain was determined by the egg-yolk turbidimetric test.

Recently isolated strains from severe cases of gas gangrene all gave titres of seven egg units per ml. or more. Similar results were obtained with some strains obtained from dust, from a superficial wound, and in the course of a P.M. examination. In 15 out of 16 strains the combining value of their toxins averaged 38 egg units (76 mouse M.L.D.) when measured against one I.U. of antitoxin.

From their examination of capsules, the authors conclude that "If a strain has a narrow capsule this suggests good toxigenic ability : a wide capsule in most cases indicates poor toxigenicity".—D. L. HUGHES.

BERNHARDT, E. (1944). **Ringworm in Domestic Animals.**—*Middx Vet.* **4.** 6–11. **2378**

An article describing clinical, microscopic, and cultural diagnosis of ringworm in the domestic animals.
—R. COOMBS.

LEITE, A. S. (1940). Résultats de quelques essais d'inoculation de champignons des teignes aux animaux. **[Transmission of Ringworm to Animals].**—*Arch. Inst. Pasteur Algér.* **18.** 464–467. **2379**

G. pigs were found to be the most suitable laboratory animals for use in the transmission of *Microsporon canis*, *Achorion schönleinii*, and *Ctenomyces mentagrophytes*. Mice were comparatively resistant to infection. It is recommended that transmission experiments be controlled by recultivation from the lesions, to ensure that the infecting strain is identical with the inoculated strain.—ISOBEL W. BROCKLEHURST.

MASTROFRANCISCO, N., & RAIMO, H. F. (1940). Aspergilose em aves. [*Aspergillus* **Infection in Birds].**—*Rev. Indústr. anim.* **3.** No. 4. 71–101. [English and French summaries]. **2380**

This is a study of six cases of avian aspergillosis—four in domestic fowls, one in a turkey, and one in a pigeon. The cultural characters of the causal organism, *A. fumigatus*, are described, together with the histopathological changes found in the internal organs of spontaneous and experimental cases.
—ISOBEL W. BROCKLEHURST.

Tui, C., & Schrift, M. H. (1942). **Production of Pyrogen by Some Bacteria.**—*J. Lab. clin. Med.* **27.** 569–575. **2381**

A study was made of the production by 18 strains of bacteria, belonging to different genera and families, of pyrogen, described as a filtrable product of the bacteria of surface and river waters, which has been shown to cause a febrile reaction in animals upon intravenous injection. The appearance of a febrile reaction with leucopenia in a dog within 30–45 min. of the intravenous injection of the Berkefeld filtrate of cultures of the various bacterial strains, was taken as the index of a positive pyrogenic reaction. Pyrogen was shown to occur in a number of the strains and was unassociated with nucleic acid content, pathogenicity, chromogenicity, or Gram-positiveness. Pyrogen production by a yeast indicated that higher forms than bacteria might possess this property.

Although pyrogen is described as a bacterial product which chemically and immunologically remains an unknown entity, being neither lethal nor antigenic, it is nevertheless recognized as being physiologically potent.—R. O. Muir.

Martin, G. J., & Fisher, C. V. (1944). **Nutritional Status of Staphylococcus Aureus as Influenced by Proflavine.**—*J. Lab. clin. Med.* **29.** 383–389. [Authors' summary copied *verbatim*]. **2382**

Proflavine, 2 : 8-diaminoacridine, produces bacteriostasis in *Staphylococcus aureus* cultures by inhibiting adenine-containing physiologically important factors : adenylic acid, coenzymes 1 and 2 and adenine flavine dinucleotide. This fact was demonstrated by the inhibition of the action of proflavine by adenine, adenylic acid, cozymase, and nucleic acid (yeast). Further, metabolic intermediates of the action of these agents inhibit acridine ; included among these intermediates are glutamic acid, lactic acid, acetic acid, pyruvic acid, and gluconic acid.

Certain agents which inhibit acridines and constitute exceptions to the above scheme are discussed.

See also absts. **2558, 2599** (mastitis), **2560** (streptococci), **2460, 2465, 2472, 2477, 2555, 2556, 2569-2571** (TB.), **2467** (caseous lymphadenitis in lambs), **2557** (salmonella), **2554** (brucella), **2419, 2420, 2533-2535** (tetanus), **2466** (*Aspergillus* in fodder), **2564-2568** (technique), **2579-2585** (air-borne infection).

DISEASES CAUSED BY PROTOZOAN PARASITES

Appelmans, M., & Lams, I. (1942). Lésions expérimentales du globe oculaire et du nerf optique par Trypanosoma marocanum chez le chien. **[Lesions of the Eyeball and Optic Nerve in Experimental *T. marocanum* (= *T. evansi*) Infection in Dogs].**—*Ann. Soc. Belge méd. trop.* **22.** 95–122. **2383**

In the majority of dogs infected with *T. evansi*, the volume of the eyeball is increased due to an increase in the anterior-posterior diameter, the anterior portion of the eye being particularly involved. Microscopically, there is keratitis and leucocytic infiltration, with the formation of new connective tissue and capillaries. There is an acute purulent iritis, with cellular invasion of the anterior and posterior chambers, and the deposition of pigment. The exudation into the anterior chamber forms a plug which occludes the pupil. The optic nerve shows interstitial neuritis and perineuritis. The lens capsule shows destruction and proliferation of the anterior epithelium, with solution of the fibres. In the orbital cavity there is an increase in the fibroconnective tissue and increased vascularity. Infection is thought to reach the eye more probably *via* the bloodstream than through the nervous system.

—U. F. Richardson.

Roubaud, E., & Provost, A. (1944). Infection chronique neurotrope produite chez le rat blanc par *Trypanosoma equinum* Voges, 1901. **[Chronic Neurotropic Infection in the White Rat Due to *T. equinum*].**—*Bull. Soc. Path. exot.* **37.** 34–36. **2384**

A strain of *T. equinum*, which had been maintained in small animals for five years and had previously killed regularly in 1–2 weeks, was inoculated into a white rat. The rat developed a blood infection which was readily detectable for 3 months, but which then entered the chronic phase for 2½ months, and finally disappeared from the blood. The animal became emaciated and was killed 8½ months after inoculation, when no trypanosomes were detectable in the blood. The blood failed to infect on subinoculation, but one out of three animals inoculated with cerebral material became infected.

In later passages, the infection reverted to the usual acute type except that one rat survived for 68 days, and another for 43 days.—U. F. Richardson.

Vaucel. (1942). La maladie du Sommeil au Cameroun. **[Sleeping Sickness in the Cameroons].**—*Rev. Sci. méd. pharm. vét. Brazzaville.* **1.** No. 2. 88–108. **2385**

Statistics are given as to the effectiveness of drug treatment in controlling sleeping sickness in the Cameroons from 1923–38. There has been a remarkable reduction in the number of new cases, in the mortality, and in the number of persons showing blood infections, but it is argued that it is doubtful whether the result can be wholly ascribed to drug treatment. Under treatment, the number of infected carriers is rarely reduced below 1%, and this method of control always leaves a residual infection which under favourable conditions may flare up into serious disease. The best results have been obtained when treatment has been undertaken in new areas of infection. It is suggested that in these areas the balance of environmental conditions and the infection of the tsetse flies with virulent trypanosomes is unstable, and that there might have been a retrogression of disease in the absence of treatment, owing to the failure of virulent trypanosome strains to survive in the flies. In old areas where the disease has become relatively quiescent, serious outbreaks occur from time to time, and no satisfactory explanation has been given. They have been ascribed to the creation of drug-fast strains, but this seems unlikely as patients are removed to other areas for treatment.

The radical methods of control by the removal of the population from infected areas or the destruction of the tsetse fly are discussed, but the former is said to interfere too much with local economics and native life, and the latter to be too formidable a task.

A careful study of the conditions governing the survival of virulent trypanosome strains in tsetse flies is considered to be possibly the line of research likely to yield the most important results.—U. F. Richardson.

de Aboim-Inglez, A. L., & da Silva Leitão, J. L. (1942). Um caso de infestação do útero duma porca pelo " Balantidium coli " (Malmsten, 1857). **[*Balantidium coli* Infection of the Uterus of a Pig].**—*Bol. pec., Lisboa.* **10.** No. 1. 105–110. **2386**

Balantidium coli was isolated from the pus of a case of purulent metritis. There was enlargement of the lymph nodes and a discharge from the vulva. The

uterus was 4–8 mm. thick. There were two emaciated foetuses present; they were slimy and covered with a yellowish, odourless pus.

The pus contained 2–3 ciliates per field. Bacteria were also present. Tests for brucellosis gave negative results. The uterine and vaginal mucus contained 3–4 times more parasites than were present in the pus.

—H. G. Cimino.

Iyer, P. V. S., Shortt, H. E., & Menon, K. P. (1941). **The Stage of *Plasmodium gallinaceum* Found in the Incubation Period. Second Observation.**—*J. Malar. Inst. India.* **4.** 179–180. 2387

The authors record the finding of the exoerythrocytic forms of *P. gallinaceum* on the fifth day of the incubation period. Previously they were recorded on the sixth day. It is suggested that intensive search may reveal the presence of these forms still earlier.

—B. C. Basu.

Hawking, F. (1944). **Tissue Culture of Malaria Parasites (*Plasmodium gallinaceum*).**—*Lancet.* **246.** 693–694. 2388

Since exo-erythrocytic forms of *P. gallinaceum* live in reticulo-endothelial cells and in the capillary endothelium of the brain and other organs—cells which can be grown by the standard methods of tissue culture—it was thought that *in vitro* cultivation of these stages might be possible. Tissue was taken from chicks 20 days old, which had been infected eight days previously by intravenous injection of parasites. Such chicks die after 8–9 days with great numbers of exo-erythrocytic forms in the capillaries of the brain, spleen, bone marrow, liver, etc. Tissues from the spleen, liver, bone marrow, and brain were implanted in roller tubes in a mixture of plasma and embryo extract. The fluid phase was obtained by the addition of Tyrode's solution and embryo extract. After a few days, numerous parasites were obtained in the cultures of spleen and bone marrow; they were less numerous in the liver. The most common form of the cultured parasite is the large oval schizont containing many pieces of chromatin. What appear to be healthy parasites have been found on the 15th day of culture. Tissue taken from tubes on the 8th and 9th days was injected intraperitoneally into chicks, which became infected with typical endo- and exo-erythrocytic forms. H. considers that multiplication really occurs *in vitro* because, although parasites are difficult to find in the original implant, they occur in large numbers after cultivation for several days. Groups of small mononuclear forms are often found, which are presumably derived by division from a large schizont. The further study of this technique is being pursued.

—C. Horton Smith.

Tambs-Lyche, H. (1943). Ixodes ricinus og piroplasmosen i Norge. [*I. ricinus* **and Piroplasmosis in Norway**].—*Norsk VetTidsskr.* **55.** 337–366, 401–441, 449–506 & 513–542. 2389

Piroplasmosis in cattle in Norway is of strictly limited geographical extent, occurring in a narrow zone all round the coast but not extending to the northernmost stretches. Its incidence naturally varies from year to year and averages somewhat over 1,000 cases, according to the official livestock disease returns. The author has attempted to calculate, by means of a mathematical formula, the true complete incidence, *i.e.* supposing that every case could be notified, for every territorial unit or district. Non-piroplasmic haemoglobinuria also occurs alongside piroplasmosis, but on the whole is less prevalent. The districts most severely affected with piroplasmosis are More and Romsdal (south of Trondheim) and West Agder (in the extreme south). Although clinical cases occasionally occur in winter, the disease is essentially a summer one by reason of its vector, *Ixodes ricinus*; indeed the extent of piroplasmosis is merely an indication of the tick population at any particular time, and this is governed chiefly by climatic conditions, ticks and piroplasmosis being more prevalent in wet and warm summers. The double annual peak of prevalence of *I. ricinus* noted in Scotland by MacLeod, with a high peak in early summer and a low secondary peak in autumn, these being dependent on climatic conditions favouring tick activity, are stated hardly to occur in Norway. Observations are reported on this point comprising tick counts on three cows during the period June-October, which show a high peak in the second week in June, shortly after the cattle are turned out to summer pasture, then a steady decline to early August, then a very small peak followed by continuation of the decline. The systematics of *Babesia bovis* is discussed and it is concluded that only a single type or strain is involved.

Detailed data on specimens of *I. ricinus* obtained in Norway are set out. Adults were recovered from man, cattle, the horse, sheep, goat, dog, and cat; nymphs from cattle, the horse, sheep, goat, squirrel, jay, blackbird, song thrush, and eagle owl; and larvae from cattle, the squirrel, shrew, and blackbird. Copulating pairs were observed on cattle and sheep and it was noticed that ungorged as well as gorged females could copulate. Both light and dark specimens were seen, but all were considered to be of a single species or type.

Ticks were found at heights up to 500 metres above sea level. Several photographs show representative tick terrain consisting of hillside grass plots merging into thicket with more or less bracken. Ticks were to be found in thicket where the micro-climate was relatively stable and humid, in accordance with known facts about the life conditions of this tick. In this connexion, MacLeod's observations are discussed at length.

It is stated that the control of ticks and of piroplasmosis is not essentially difficult, consisting of the clearance and fencing of pasture, and the dipping of affected farm animals or removal of the ticks by other means, together with medicinal treatment. It was shown that the repeated removal of ticks from cattle on a particular pasture, all through one grazing season, greatly reduced the tick incidence during the following years.—J. E.

*Hoekstra, J. (1942). **[Post-Mortem Findings of Dogs with Uraemia and Leptospirosis].**—*Tijdschr. Diergeneesk.* **69.** 448–455. [Abst. from abst. in *Wien. tierärztl. Mschr.* **30.** 151]. 2390

From the results of 32 P.M. examinations, it is concluded that in acute leptospirosis there is usually no macroscopic alteration of the kidneys, although considerable degenerative changes can be detected histologically. Diagnostic value is attached to petechial haemorrhages under the pleura and to certain liver lesions which precede jaundice.—U. F. Richardson.

See also absts. **2426, 2427, 2524, 2525** (trypanosomiasis), **2572** (avian malaria), **2536, 2537** (coccidiosis), **2538** (canine piroplasmosis).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

Lo Russo, R. (1943). Investigación de la fórmula leucocitaria de la leche perteneciente a vacas con aftosa en pleno período de laceración de las aftas y fórmula leucocitaria de la sangre procedente de vacas con aftosa en el período febril antes de la aparición de las aftas. **[Leucocyte Count of Milk**

from Cows in the Postvesicular Stage of Foot and Mouth Disease, and of Blood from Cows in the Febrile, Prevesicular Stage of Infection].—*Rev. Med. vet., B. Aires.* **25.** 562–575. **2391**

Leucocyte counts were made on the centrifuged sediment of milk taken from cows during the stage of rupture of the vesicles of F. & M. disease. The films were stained with May-Grünwald-Giemsa. The following results were obtained :– lymphocytes, 50% ; monocytes, 28% ; neutrophiles, 16% ; eosinophiles, 6%.

Leucocyte counts made on the blood of cattle during the febrile period preceding the formation of the vesicles gave the following results :– lymphocytes, 63% ; monocytes, 8% ; neutrophiles, 22% ; eosinophiles, 7%.—Isobel W. Brocklehurst.

v. Nádosy, F. (1942). Ueber Stomatitis aphthosa epidemica des Menschen. **[Foot and Mouth Disease in Man].**—*Dtsch. med. Wschr.* **68.** 729–730. **2392**

Unassociated cases of disease in two men in Budapest were diagnosed clinically as being due to infection with F. & M. disease virus. Apart from fever and stomatitis, some unusual symptoms were noted : both had a severe conjunctivitis ; one had a severe balanoposthitis and urethritis, and the other a subclinical urethritis. One patient showed a transient, possibly nonspecific, positive Wassermann reaction during the course of the disease. Recovery was complete in both cases.—E. Cotchin.

Kubes, V., & Gallia, F. (1943). La cerebro-neutralización, nueva reacción biológica para el virus rábico. Su relación con la prueba de protección y la seroneutralización. **[Brain-Tissue Neutralization, a New Biological Reaction for Rabies Virus. Its Relation to the Protection and Serum-Neutralization Tests].**—*Bol. Inst. Invest. vet., Caracas.* **1.** No. 4. pp. 105–152. [English summary]. **2393**

The brain tissue of mice actively immunized against rabies contains antibodies which neutralize the homologous virus *in vitro*. The antibody content increases in direct proportion to the degree of *in vivo* immunity. Therefore a brain-tissue neutralization test gives an accurate measure of an animal's immunity. On the other hand, a serum neutralization test does not provide evidence of the state of antirabic immunity. This indicates that the resistance of the body against rabies depends on tissue antibodies (cellular immunity) rather than on serum antibodies (humoral immunity).

The amount of antibodies in the cerebral cells can be increased by repeated intracranial injections of vaccine. The *in vitro* neutralizing power of the brains of such mice, in proportion with that of the serum, is greater than when the animals are immunized intraperitoneally. This is probably due to the direct stimulation of the brain tissue on the formation of local rabies antibodies, independent of humoral antibodies.

In conclusion, it is stated that the brain-tissue neutralization test, which is more specific and more sensitive than the serum-neutralization test, should be used for the estimation of the antigenic power of antiabic vaccines, as well as for the immunological differentiation between strains of virus.—I. W. Brocklehurst.

Taylor, R. M., Parodi, A. S., & Chialvo, R. J. (1943). Susceptibilidad del galictis furax furonax al virus de la influenza. **[Susceptibility of the Grison, *Galictis furax furonax*, to Influenza Virus].**—*Rev. Inst. bact., B. Aires.* **11.** 466–468. **2394**

The grison, a mustelid of southern Brazil and northern Patagonia, is susceptible to influenza viruses A and B. Injection of either virus into the animal results in the development of specific serum antibodies.

—Isobel W. Brocklehurst.

Lajmanovich, S., Parodi, A. S., & Chialvo, R. J. (1943). Adsorción del virus de la influenza. **[Adsorption of Influenza Virus].**—*Rev. Inst. bact., B. Aires.* **11.** 463–465. **2395**

Influenza virus, growing in chick-embryo allantoic fluid, is adsorbed almost completely by potassium urate, in the proper concentration, with a negligible loss of infectivity.—Isobel W. Brocklehurst.

I. Stanley, W. M. (1944). **The Size of Influenza Virus.**—*J. exp. Med.* **79.** 267–283. **2396**

II. Friedewald, W. F., & Pickels, E. G. (1944). **Centrifugation and Ultrafiltration Studies on Allantoic Fluid Preparations of Influenza Virus.**—*Ibid.* 301–317. **2397**

I. In view of the recent differences of opinion on the size of the influenza virus particle, S. has made a further investigation using two strains (PR8 and F12) grown on allantoic fluid. The sedimentation behaviour in the presence and absence of a sucrose density gradient was studied and an attempt made to separate small and large components by differential centrifugation. The sedimentation activity in dilute solutions was most variable, the figures of particle size ranging from 80–120 mμ to 10 mμ. The F12 strain yielded a much higher proportion of the smaller particles than PR8. This difference is held to explain the variations in size reported by Chambers *et al.* [*V. B.* **13.** 353.] who worked with F12 and by Taylor *et al.* [*V. B.* **14.** 120 & 269.] who studied PR8 and WS viruses.

In the presence of sucrose, the small particles were not detected, due to the absence of convection or mechanical disturbances during centrifugation. It is suggested that activity is associated solely with material having a sedimentation rate of 600S (Svedburg units) particle size 70 mμ or more, the infective particle of 30S (10 mμ) representing dispersed fractions of the former.

II. In confirmation of the findings of Stanley [see I] it is shown that PR8 and Lee viruses in allantoic fluid are not completely sedimented in an air-driven angle centrifuge of the vacuum type owing to the influence of convective disturbances. When this factor is counteracted by using a synthetic density gradient of sucrose containing 0, 8, 16, and 24% respectively, a clear-cut sedimentation boundary is produced. The constant of the Lee virus particle was then found to be 800S, whilst that of PR8 was only 700.

Results obtained with the optical ultracentrifuge supplied confirmatory evidence of the size of the particles. The Lee virus, however, was composed mainly of mono-disperse elements (800S), whereas PR8 showed heterodisperse layers with constants of 460S and 700S respectively. Filtration of these viruses through graded collodion membranes gave particle sizes within the range of 80–135 mμ.—R. E. Glover.

I. Miller, G. L. (1944). **A Study of Conditions for the Optimum Production of PR8 Influenza Virus in Chick Embryos.**—*J. exp. Med.* **79.** 173–183. **2398**

II. Lauffer, M. A., & Miller, G. L. (1944). **The Mouse Infectivity Titration of Influenza Virus.**—*Ibid.* 197–203. **2399**

III. Stanley, W. M. (1944). **An Evaluation of Methods for the Concentration and Purification of Influenza Virus.**—*Ibid.* 255–266. **2400**

IV. Knight, C. A. (1944). **The Stability of Influenza Virus in the Presence of Salts.**—*Ibid.* 285–290. **2401**

I. It is known that the titre of influenza virus in allantoic fluid is dependent upon the strength of the inoculum used and on other factors. Working with PR8 virus, M. has obtained the following information.

The optimum amount of virus is produced by a

concentration approximately 100fold that of the highest dilution which will induce infection. Incubation temperatures of 35°–37°C. are the most satisfactory. Both these factors operate by delaying the death of the embryo, and this is unfavourable to the production of high titres of virus : at the same time, a sufficient period must elapse for an adequate multiplication of the seed material. An incubation period of 36–40 hours should not, therefore, be exceeded. Consistently high titres were obtained with embryos 10–11 days of age at the time of inoculation.

II. Experiments were undertaken in mice to determine the variations in the measurement of infective titres of egg-adapted PR8 virus. In each instance five replicate titrations were made, the surviving mice being killed at the tenth day. The criteria used were (a), occurrence of specific death within ten days, (b) extent of pulmonary lesions, and (c) a weighted composite taking both factors into account. The score system of Horsfall [*V. B.* **10.** 26.] was used. The standard deviations were 0·283, 0·356, and 0·237 respectively. The weighted composites were slightly more reliable than specific deaths. It was estimated that if titrations of two virus samples gave a difference of 0·736 units, the chances were about 19 out of 20 that the two samples were not identical.

III. Influenza A virus (infective allantoic fluid) was concentrated and purified by (a) differential centrifugation in a high speed vacuum centrifuge at 24,000 r.p.m., (b) an elution of the precipitate formed by freezing and thawing, and (c) adsorption and elution from adult or embryonic fowl red cells. Activity was measured in terms of fowl cell agglutinating units and by titration in chick embryos. Method (a) gave a high yield of virus of low, non-specific protein content : the other methods yielded recoveries of 50–90%.

Since high-speed vacuum centrifugation is not suitable for large-scale work, virus-containing fluids were passed through a Sharples centrifuge. Although less effective than the vacuum type, a recovery rate of 70% of virus on the centrifuge liner was obtained at a flow rate of 1 litre per hour. This apparatus is, therefore, to be recommended for the large-scale preparation of purified virus.

IV. The stability of influenza virus in various solvents at pH 7·0 was studied using 0·001 and 1·0 *M* phosphate, 0·1 *M* veronal and 0·1 *M* borate buffers, distilled water, and 0·85% saline. Borate, veronal, and phosphate buffers showed equal ability to maintain activity over several weeks at 4°C. Considerable inactivation of virus occurred in distilled water and saline solutions. There was, however, an apparent increase (10–1,000fold) in the activity of such partially inactivated virus when the solution was diluted with phosphate buffer.—R. E. Glover.

Knight, C. A., & Stanley, W. M. (1944). **The Effect of some Chemicals on Purified Influenza Virus.** —*J. exp. Med.* **79.** 291–300. **2402**

Tests were made on the effects of 20 different chemicals on the activity of purified PR8 virus. Concentrated precipitates prepared by ultrafiltration and diluted with 0·1 *M* phosphate buffer were mixed with equal amounts of the chemicals under test, the final protein concentration being about 10^{-4}g. per ml. Activity was detected by the inoculation of mice and developing eggs.

The chemicals having a direct inactivating effect were the salts of heavy metals (copper sulphate, silver nitrate etc.) and mercurochrome. Iodine, iodoacetamide, formaldehyde, and the detergents phemerol, roccal, and sodium dodecyl sulphate were also potent in high dilutions. Reducing agents such as glucose, sodium thiosulphate etc., had little effect, with the exception of ascorbic acid. Phenol in strengths mainly used for bactericidal purposes was only feebly viricidal, but 0·5 N solutions were effective. Sulphathiazole sodium selected as a typical member of the sulphonamide group was not very active : this observation may explain the ineffectiveness of these drugs in preventing infection in mice.—R. E. Glover.

Smetkin, M. F. (1941). Dannye patogeneza i puti rannei diagnostiki epizooticheskovo entsefalomielita u loshadei. **[Pathogenesis and Early Diagnosis of Equine Encephalomyelitis].**—*Trud. XV Plen. vet. Sekt. Akad. sel'khoz. Nauk, Moscow, 1939.* [*Diseases of Horses*]. pp. 44–48. [Abst. from translation]. **2403**

In an attempt to improve methods of treatment and early diagnosis of E.E., S. studied the pathogenesis of the disease and he describes his results under the following headings :– (1) functional state of the reticulo-endothelial system, (2) fluctuation of antibodies in connexion with disturbances of the functions of the r.e.s., and (3) metabolism—(a) sugar and lactic acid of the blood, (b) alkali reserve, gases, and blood diagram.

Using rabbits, cats, and dogs, S. showed that parenteral administration of products of disintegration of r.e.s. elements may produce a considerable increase in the titre of natural antibodies (haemagglutinins). Experiments on horses convalescent from E.E. indicated that, during the course of the disease, the natural antibodies are decreased (" blockade " of the r.e.s.), but, when recovery commences, the isohaemagglutinin titre, in some cases, rises. In treatment of cases of E.E., the blood or serum of convalescents was of some value. For early diagnosis, the high titre of the serum of convalescents and the high agglutinability of red blood corpuscles of horses with latent E.E. might be useful indications. By studying the morphogenesis of the blood in groups of horses with E.E., S. concluded that latent cases may exist, in which stimulation of the r.e.s. probably accounts for the failure of nervous symptoms to develop. Rabbits infected with blood from a latent case developed the disease and, from these, other rabbits were infected. Blood diagrams of latent cases showed an increase in white blood cell count but a decrease in the r.b.c. count, colour index up to 1·4, young forms of leucocytes followed by lymphocytosis on recovery, and reduction in osmotic stability of the r.b.c. Metabolic studies on open cases of E.E. revealed a progressive acidosis, the alkali reserve falling considerably just before death ; anoxaemia was pronounced. Acidosis was not present in latent cases.

S. concludes from these studies that therapeutic measures should include specific immunobiological and symptomatic treatment.

By cataphoresis, absorption of E.E. virus by equine r.b.c. was induced and these were then used to hyper-immunize rabbits. Similar antibodies were then eliminated from the rabbit serum by bringing it into contact with rabbit r.b.c., thus leaving antibodies specific to equine r.b.c., and even more specific to r.b.c. taken from cases of open or latent E.E. This phenomenon proved to be an effective method of diagnosing latent cases of infection. To check the specificity of this method, S. was investigating haemagglutination in cases of infectious anaemia and babesiasis in horses.

—G. B. S. Heath.

Noran, H. H. (1944). **Chronic Equine Encephalitis.** —*Amer. J. Path.* **20.** 259–267. **2404**

A probable case of human infection with the Western equine encephalomyelitis virus is described, in which the gross and microscopic lesions were identical with those previously reported in a proved case. The

pathological picture comprised extensive cystic degeneration of the left frontal and temporal lobes, dilatation of the left ventricle, with microscopic evidence of inflammatory foci and occlusion of blood vessels by endothelial proliferation and calcium granule deposition.

N. comments that during recent years evidence has accumulated indicating that, in infections of human beings with the virus of equine encephalomyelitis, permanent and progressive residual lesions may result, especially in children.

The patient whose illness forms the basis of this article is considered probably to have been infected for over 40 years and the comment is made that in some virus infections, recovery from the acute illness merely indicates an ability of the host to prevent the further spread of the virus, but that the noxious agent is not destroyed, and is capable of again spreading as soon as the host's resistance is reduced. N. says "at least in equine encephalitis, one questions whether the virus is ever destroyed, once it invades the human organism".
—E. COTCHIN.

—. (1944). **Encephalitis in Man due to Venezuelan Virus of Equine Encephalomyelitis.**—*Bull. U.S. Army med. Dep.* No. 73. pp. 12–13. **2405**

The first epizootic of E.E. reported in Trinidad involved one human case, which was fatal. Cross-immunity tests, with brain material, showed the virus to be of the Venezuelan type. Only two cases of infection with this virus have previously been reported in man, and they were mild.—D. N. SPRIGGS.

CASALS, J. (1943). **Neutralizing and Complement-Fixing Antibody Production and Resistance Following Vaccination in Experimental Encephalitis Infections.**—*J. exp. Med.* **78.** 447–463. **2406**

Using live and formolized vaccines of Western equine encephalomyelitis and St Louis encephalitis viruses, C. tried to correlate the immunity response of vaccinated mice with their titre in neutralizing and complement-fixing antibodies. The results confirmed the view that the antibody titre and resistance, as judged by intracerebral inoculation in mice, do not always run parallel to one another. Whilst better correlation could be hoped to exist with other viruses or under less artificial conditions, such as a more natural host or portal of entry, C. stresses the necessity of caution in interpreting antibody levels as criteria of resistance following vaccination of populations in the field.
—M. L. LEVI.

VICTOR, J., & HUANG, C. H. (1944). **Depression of Anaerobic Glycolysis of Embryonic Tissue by Western Strain of Equine Encephalomyelitis Virus. Prevention of this Effect by Specific Immune Serum.**—*J. exp. Med.* **79.** 129–135. **2407**

Many studies have shown that growing tissues have higher glycolytic rates than resting tissues composed of the same type of cells. The authors have demonstrated that infection of embryonic chick tissues with Western E.E. virus decreases their anaerobic glycolysis. The virus depressed the rate of anaerobic glycolysis within two days of its addition to the tissues, and this decrease continued for 2–4 days. The decrease could not be detected before four hours or after six days.

Western E.E. antiserum specifically inhibited the depressant action of the virus on the anaerobic glycolysis of embryonic skeletal muscle.—D. L. HUGHES.

SIGURDSSON, B. (1943). **The Influence of Age of Host and Temperature of Incubation on Infection of the Chick Embryo with Vesicular Stomatitis Virus.**—*J. exp. Med.* **78.** 17–26. **2408**

S. found seven-day-old chick embryos much more susceptible to infection with vesicular stomatitis virus than ten-day-old embryos. In the younger embryos there was a 100% mortality. The growth of the virus in the seven- and ten-day embryos was studied at two different temperature levels, 35°–36°C. and 39°–40°C. The ten-day embryos showed a more severe infection at 35°–36°C., whereas at the higher temperature of 39°–40°C. more than half of them survived. In the seven-day embryo, however, death occurred sooner at the higher temperature, *i.e.* at 12 hours at 39°–40°C., whereas at 35°–36°C. death took place at about 16 hours.
—D. L. HUGHES.

LOMBARD, R. (1944). **Virus Encephalitides in Dogs.**—*Middx Vet.* **4.** 3–5. **2409**

L. names five virus encephalitides of dogs, *viz*, BECKMAN & TORREY virus encephalitis [*V. B.* **11.** 707.], distemper, rabies, fox encephalitis, and the Western type of equine encephalomyelitis. The article is an interesting brief survey of the literature together with L.'s experience of the epidemiology, prophylaxis and treatment of the first two diseases mentioned.
—R. M. LOOSMORE.

HAMMON, W. McD., & REEVES, W. C. (1943). **Laboratory Transmission of St. Louis Encephalitis Virus by Three Genera of Mosquitoes.**—*J. exp. Med.* **78.** 241–253. **2410**

A report of the successful laboratory transmission of St Louis encephalitis virus by nine different species of mosquitoes. Infection was found to have been carried by the members of one species (*Culex tarsalis*) from artificially infected chickens or ducks to healthy birds, a fact which is taken as proof that poultry may serve as reservoirs of the virus in nature.—J. C. BUXTON.

BLATTNER, R. J., & HEYS, F. M. (1944). **Blood-sucking Vectors of Encephalitis: Experimental Transmission of St. Louis Encephalitis (Hubbard Strain) to White Swiss Mice by the American Dog Tick, *Dermacentor variabilis* Say.**—*J. exp. Med.* **79.** 439–454. [Extract from authors' summary copied *verbatim*]. **2411**

(1) The common dog tick, *Dermacentor variabilis*, is capable of being infected with the virus of St. Louis encephalitis, Hubbard strain, by feeding on inoculated animals and, once infected, can transmit to normal susceptible animals by bite. (2) A female can transmit the infection to her offspring, through all stages of metamorphosis of the 2nd generation into the 3rd generation. (3) Ticks infected under laboratory conditions and kept inactive at a temperature of 12·5°C., remained infective for at least a period of 10 months. Eggs laid by an infected female and stored in a refrigerator (12·5°C.) for 10 months retained infective virus, and larvae hatched from such eggs at the end of the 10 months of dormancy were also infective.

BROADHURST, J., MACLEAN, E., & TAYLOR, I. (1943). **Increased Incidence of Cytoplasmic Virus Bodies in Human Throats in the New York City Area.**—*J. infect. Dis.* **73.** 195–197. **2412**

In 1936 BROADHURST, CAMERON, & TAYLOR drew attention to cytoplasmic inclusion bodies in the throats of "normal" individuals. There was an incidence of about 8% in 250 people examined. In this article, an increased incidence of such inclusion bodies is reported in 1943 in the New York City area. Of 224 persons examined, 65% yielded positive throat smears for these bodies. Many of the positive individuals complained of inflammation of the throat and adjacent membranes. There was a tendency for the affected individual to develop the carrier state.—D. L. HUGHES.

Beck, M. D., Eaton, M. D., & O'Donnell, R. (1944). **Further Laboratory Studies on the Classification of Psittacosis-Like Agents.**—*J. exp. Med.* **79.** 65–77. **2418**

Pathogenicity tests and latency tests as well as active cross-immunity tests were used with success in an attempt to differentiate between six viruses of the psittacosis group. The authors confirm previous work [*V. B.* **13.** 53.], and present evidence to the effect that known psittacosis-like viruses causing atypical pneumonia in man fall into three groups, *viz*, psittacosis, ornithosis [see *V. B.* **12.** 537.] and human pneumonitis of undetermined origin. The last is not identical with meningo-pneumonitis virus isolated from ferrets infected with human throat washings. Furthermore, the virus of lymphogranuloma venereum and the mouse pneumonia virus described by Nigg are quite distinct from the four other viruses mentioned above.—M. L. Levi.

Gilmore, R. M. (1943). **Mammalogy in an Epidemiological Study of Jungle Yellow Fever in Brazil.**—*J. Mammal.* **24.** 144–162. [Abst. in *Trop. Dis. Bull.* **41.** 211, copied *verbatim*. Signed: Hugh H. Smith]. **2414**

The author of this report is a zoologist who, from 1935–1938 was attached to the yellow fever service maintained jointly by the Government of Brazil and the Rockefeller Foundation. During the period of his stay in Brazil, intensive studies on the rôle of wild animals in the epidemiology of jungle fever were in progress. The types of traps which were found most useful for the capture of various wild animals are fully discussed and illustrated. From his considerable experience the author states his views on the keeping of proper field records, the collection and preservation of specimens for subsequent study, the collection and preservation of ectoparasites, the presentation of taxonomic information, and the methods of handling animals in the field. Useful data on the estimation of age and growth rates of certain animals are given. This information is, of course, important where immunity surveys on animal populations are undertaken. Also some observations on the territorial movements of Cebus monkeys are reported. These animals have been suspected repeatedly of being of importance in the spread of yellow fever infection in forested areas.

[This paper will be of value to those who are concerned with the investigation of epidemiological problems in which wild animals may play a rôle.]

*Paraschivescu, N. (1941). Über den experimentellen Beweis der Korpuskularität des Bakteriophagen. **[Experimental Evidence that the Bacteriophage is Particulate]**.—*Bull. Sect. sci. Acad. roum.* **24.** 201–206. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **144.** 335]. **2415**

Experiments have shown that the bacteriophage is composed of independent particles, each of which has the power to induce lysis.—O. Cruse.

See also absts. **2452** (rabbit papilloma), **2453**, **2454** (fowl sarcomas), **2421**, **2422** (bacteriophage).

IMMUNITY

Flückiger, G. (1943). Die Bedeutung der Vakzineforschung für die Wirtschaft. **[Vaccination of Livestock]**.—*Schweiz. Arch. Tierheilk.* **85.** 315–327. **2416**

F. considers that effective vaccines are available for the following diseases of livestock: malignant oedema, blackleg, anthrax, swine erysipelas, foot and mouth disease, and swine fever. Vaccines which he considers ineffective are those against bovine TB., bovine brucellosis, infectious agalactia of sheep and goats, and equine infectious anaemia. It is mentioned that porcine encephalomyelitis (Teschin disease) of pigs which appeared in Switzerland in 1940 has now been eradicated by police control measures, and hence the vaccine which promised success in the laboratory could not be tested in the field.

Waldmann's foot and mouth disease vaccine has been used in Switzerland since 1942.—D. L. Robarts.

—. (1944). **A New Vaccine for the Army.**—*Lancet.* **246.** 318. **2417**

The substitution by the British Army authorities of a new TAB vaccine, killed by 75% and preserved in 25% alcohol, for the old heat-killed, carbolized preparation, is described. While the new vaccine is produced from fully virulent strains and contains the essentially full complement of Vi antigen, it has the disadvantage of more complete sedimentation than the old saline suspension. Its main advantages are that the vaccinating doses are smaller for both sexes, that a superior antibody response is induced and that both local and general reactions are less severe than with the old vaccine. The proposed inclusion of a representative of the *Salmonella paratyphi* C group in the new vaccine was rejected in view of the rarity of this kind of infection in the army.—R. O. Muir.

Mertz, B. (1942). Ueber unspezifische Luesreaktionen tierischer Sera. **[Nonspecific Syphilis Reactions with the Sera of Animals]**.—*Z. ImmunForsch.* **102.** 37–45. **2418**

It has long been known that animal sera may occasionally give positive reactions to the Wassermann test or to flocculation tests of the Kahn type for syphilis. M. studied the reaction of normal horse and ox sera, and of the sera of animals immunized against diphtheria, dysentery, tetanus, and streptococci. In the case of horses, the mere repeated donation of blood was apparently sufficient to induce positive Wassermann reactions, and a considerable percentage of animals immunized against the above organisms also yielded positive results. In cattle, few positive Wassermann reactions were obtained, but all the normal sera and most of the immune sera tested were to some degree Kahn-positive.—Alastair N. Worden.

Koerber, W. L., Bunney, W. E., & Mook, G. E.(1943). **A Method for Increasing the Combining Power of Tetanal Toxin.**—*J. Immunol.* **47.** 507–511. **2419**

The addition of activated charcoal to certain media prior to their use for the growth of *Cl. tetani* resulted in toxin of unusually high combining values (L+ and Lf). Furthermore, alum-precipitated toxoids thus prepared were of high antigenicity and free of colouring matter. The activated charcoal was twice sterilized in hot air, then 0·2% was added to the broth and the whole autoclaved as usual. In controlled experiments it was shown that the presence of the charcoal almost doubled the combining power of the toxins, and the toxoids were of correspondingly greater antigenicity. Filter paper and cheesecloth had a similar effect in a lesser degree.

—J. Keppie.

Csáky, T. (1943). Die Empfindlichkeit weisser Ratten gegen Tetanustoxin bei vollwertiges bzw. mangelhaftes Eiweiss enthaltender Diät. **[Susceptibility of White Rats to Tetanus Toxin on High and Low Protein Diets]**.—*Pflüg. Arch. ges. Physiol.* **247.** 53–62. **2420**

Rats fed on a diet in which all protein was of vegetable origin failed to grow, while rats on such a

diet with 10% casein grew about 11 g. per week. The animals fed on the incomplete diet were also more sensitive to tetanus toxin, but it is not certain that the increased sensitivity and lack of growth are directly related. It is suggested that the high sensitivity is due to an effect on the nervous system. The results show fairly clearly that there is some variation in the lethal dose of toxin with change of diet.—E. BOYLAND.

I. HERSHEY, A. D., KALMANSON, G., & BRONFENBRENNER, J. (1943). **Quantitative Methods in the Study of Phage-Antiphage Reaction.**—*J. Immunol.* **46.** 267–279. **2421**

II. HERSHEY, A. D., KALMANSON, G., & BRONFENBRENNER, J. (1943). **Quantitative Relationships in the Phage-Antiphage Reaction: Unity and Homogeneity of the Reactants.**—*Ibid.* 281–299. **2422**

I. Using a small-plaque, high-titre common type of colon-dysentery bacteriophage, which regularly stimulated the production of potent antisera in rabbits, and an immunologically distinct large-plaque, low-titre phage, for which one antiserum was with difficulty produced, quantitative studies of phage-antiphage reactions were made. Definitions are given of the following characteristics of antiphage sera, together with methods for their measurement:– specifically precipitable nitrogen, specific rate of neutralization, neutralizing capacity, precipitating activity, and combining power. The phage-antiphage reaction is recommended for quantitative study, since phage is a virus and methods are available for its study which are not applicable to other viruses or to immune reactions in general.

II. The strains of bacteriophage, described in I, and the homologous rabbit antisera were employed in studies of the phage-antiphage reaction with the aim of obtaining a quantitative description of the reaction. The particular aspects investigated were:– qualitative differences between antiphage sera, the unity of the phage antibody and its homogeneity in individual antisera, the composition of crude phage concentrates, the combining proportions of phage and its homologous antibody, the ultimate composition of the phage particle, the absolute rate of reaction, and the specificity of the reactions.—R. O. MUIR.

See also abstr. **2348** (streptococcal allergy and immunity), **2355** (TB. antigen), **2356** (TB. immunization in Japan), **2393** (rabies immunity and diagnosis), **2406** (equine encephalomyelitis immunity).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

DE VRIES, A. H. (1943). **Factors Influencing the Vulnerability of Merino Sheep to Blowfly Attack.**—*Fmg S. Afr.* **18.** 493–500. **2423**

It has been calculated that the annual loss in South Africa due to the attacks of blowflies on sheep is about £1,500,000. One of the chief causes of susceptibility is the presence of moisture which penetrates the wool. The main predisposing factors are skin folds, conformation, abnormal vulva, length of tail, and skin development on the tail. Conformation has an important bearing on susceptibility, important features being (1) narrowness between the aitch bones, a condition usually accompanied by cow hocks, (2) drooping or goose rump, and (3) the size of the bare area surrounding the anus and vulva. Abnormal vulva is of widespread occurrence in mature sheep and leads to abnormal wetting of the crutch. A short or split tail leads to constant wetting of the wool at the end of it, and flies then attack the tip of the tail. High rainfall in some areas may result in sheep being attacked if the wool has no chance to become dry.—E. M. ROBINSON.

I. FRONING, B. (1943). Die Vorbeuge des Befalles des Magen-Darmkanales des Pferdes mit Bremsenlarven. **[Control of *Gastrophilus* Infestation of the Gastro-Intestinal Tract in Horses].**—*Z. Veterinärk.* **55.** 271–272. **2424**

II. ENIGK. (1943). Zur Vorbeuge und Bekämpfung der Gastrophilose der Pferde. **[Control of *Gastrophilus* Infestation in Horses].**—*Ibid.* 272–274. **2425**

I. F. claims that *Gastrophilus* infestations can be completely controlled by examining all horses frequently, killing any flies in the act of ovipositing, and pulling out all hairs on which eggs have been attached.

II. E. recommends that horses should be washed at intervals of 3–4 days with warm water (50°C.). This treatment causes hatching of the eggs of *G. haemorrhoidalis* and *G. intestinalis* and kills the young larvae. Eggs of *G. veterinus* and *G. inermis* must be removed either by scraping or by clipping away infected hairs. A single dose of carbon disulphide (28 g. per horse over two years old) was given in December, after 18–24 hours' fasting but without restricting the amount of drinking water. This was mainly lethal to larvae attached to the duodenum.

[Neither author appears to have considered the value of the singeing lamp in killing *Gastrophilus* eggs attached to hairs.]—J. B. CRAGG.

—. (1943). **The Activities of the Department of Tsetse Research, Tanganyika Territory, Since 1936.**—pp. 32. [fcp] [Mimeographed]. **2426**

These notes on the activities of the Tsetse Research Department include a brief review of the period 1936–38, and a more detailed account of the work carried out from 1938–42. A considerable part of the programme had to be abandoned or reduced on account of the war, and the staff of the department, which had been increased to 30 in 1938, had been reduced to eight by June 1941. The report covers research into the bionomics of, and reclamation measures against *Glossina morsitans, G. pallidipes, G. swynnertoni, G. brevipalpis, G. austeni,* and *G. palpalis,* and brief notes on laboratory investigations carried out in connexion with the work.

Notes are given on methods of estimating the population density of the flies, their ambits and tendency to dispersal, their length of life and the effects of variations in humidity, the death rate and the causes of death, larviposition, parasitism of pupae and the destruction of pupae by ants, the effects of fire exclusion and thicket formation, and the reaction of the flies to smell and sight stimuli. Laboratory investigations included studies on physiology, phototropism, methods of rearing under laboratory conditions, fertilization of females, and the relation of weight to the viability of pupae.

The report is too concentrated to allow of satisfactory abstracting, and should be consulted in the original by those interested.

H. E. HORNBY, who was appointed to succeed SWYNNERTON as director of the department, resigned at the end of 1941.—U. F. RICHARDSON.

BAX, S. N. (1943–44). **A Practical Policy for Tsetse Reclamation and Field Experiment. Part II. Part III.**—*E. Afr. Agric. J.* **9.** 83–87 & 157–162. [For part I, see *V. B.* **14.** 117]. **2427**

II. Field experiments on the destruction of tsetse by fire exclusion in Northern Rhodesia indicated that this method alone would not destroy *Glossina morsitans* everywhere in the area, but when it was combined with

the cutting of bush in a certain type of narrow drainage valley a large fall in numbers resulted.

Experiments on the effect of "selective" clearing on *G. swynnertoni*, and on the amount of clearing required to eliminate *G. pallidipes* under different climatic conditions are being continued in Tanganyika Territory, and experiments have been planned on the effect on *G. morsitans* of exterminating various species of game.

In regard to defence, it is argued that barrier clearings are too expensive and difficult to maintain, and that discriminative clearing perhaps with the avoidance of burning may provide the defence of the future.

Concerning the actual reclamation measures to be taken in Tanganyika, it is suggested that in the north where tsetse infestation occurs in isolated blocks, the country should be freed by dealing with each block in turn. In the southern part of the territory the tsetse map shows extensive eastern and western belts of *G. morsitans*, but it is not certain that these are as unbroken as they appear, and it is suggested that eradication should be begun at one end of a belt and gradually advanced. It is, however, admitted that reclamation of "miombo" country from *G. morsitans* is not yet practicable, nor is reclamation on this scale, but it is not too early to examine future possibilities.

III. The policy to be adopted, based on the information now available, is discussed. The choice lies between the advocation of reclamation by the wholesale felling of trees, and the view that the tsetse is a trustee of the land against the deforestation and soil erosion which might result from defective agricultural methods.—U. F. Richardson.

Bequaert, J. (1942). **A Monograph of the Melophaginae, or Ked-Flies of Sheep, Goats, Deer and Antelopes (Diptera, Hippoboscidae).**—*Ent. amer.* **22.** 1–210. **2428**

By exhaustive research into the literature covering Melophaginae of sheep, goats, deer, and antelopes, and from the examination of many hundreds of specimens, B. has produced an extensive monograph concerning these somewhat neglected ectoparasites. External morphology and anatomy are clearly described, and well illustrated by a series of drawings which are mainly original. The ked-flies are of world-wide distribution, although, in the tropics, they are confined to high altitudes. Any ked-free areas in temperate regions are probably the result of adequate dipping measures. The genus *Melophagus* [which is probably the only genus discussed which is of interest to British veterinarians] is dealt with in 50 pages, containing a great variety of information from widely scattered sources.—G. B. S. H.

Gregson, J. D. (1943). **The Enigma of Tick Paralysis.**—*Proc. ent. Soc. B. C.* **40.** 19–23. **2429**

This paper is a discussion on Australian and Canadian literature on tick paralysis. Theories which have been advanced as to its aetiology are discussed, but G. concludes that none of these can be entirely correct.—G. B. S. Heath.

Sergent, Ed., & Poncet, A. (1943). Etude expérimentale de la régénération des appendices chez les tiques. (Ordre des Acariens, sous-famille des Ixodinae). **[Regeneration of the Appendages in Ticks].**—*Arch. Inst. Pasteur Algér.* **21.** 215–232. **2430**

Field observations showed that nymphs of *Hyalomma mauritanicum* and *Rhipicephalus bursa* which had lost parts of appendages were able in some cases to regenerate the missing parts. Experimental work on *H. mauritanicum* in which the second pair of legs was completely removed showed that incomplete regeneration might follow such a severe injury. The amount of regeneration increased as the interval between the injury and the next moult was decreased; no regeneration occurred in those cases where the injury was made six weeks before the moult. Where no regeneration occurred, the onset of the subsequent moult was retarded.—J. B. Cragg.

Froning, B. (1943). Die klinische Diagnose der verschiedenen Räudearten. **[Clinical Diagnosis of the Several Types of Mange].**—*Z. Veterinärk.* **55.** 315–324. **2431**

F. summarizes the clinical signs of psoroptic, sarcoptic, and choroptic mange in horses, stressing by means of drawings the value of site of infection as a diagnostic character.—J. B. Cragg.

Melvin, R., Smith, C. L., & Graham, O. H. (1943). **Some Observations on Chiggers.**—*J. econ. Ent.* **36.** 940. **2432**

The authors record the occurrence in central Texas of the harvest mite *Eutrombicula alfreddugesi* [called also "chigger" in the U.S.A.], on a variety of animals including reptiles, birds, armadillos, squirrels, and goats as well as on man. Ground infested with chiggers could be located by exposing chicks 2–3 weeks old in the area for 6–8 hours. Birds, goats, and squirrels react to the presence of chiggers in a similar manner to man.

—J. B. Cragg.

Heffelfinger, J. (1943). **An Observed Infestation and Treatment of *Psoroptes cuniculi* in the Ears of Laboratory Rabbits.**—*Ohio J. Sci.* **43.** 181. **2433**

A laboratory rabbit which exhibited convulsions and loss of equilibrium was found to be affected with a scabby condition of the inner, proximal surfaces of both ears. A mite, tentatively identified as *P. cuniculi*, was present in large numbers in the heavily scabbed material in the outer ear, and, to a lesser degree, in the inner ear and semi-circular canals.

For treatment of this infestation, before the inner ear is involved, H. recommends swabbing the affected area with equal parts of 5% phenol and glycerol; 2–3 applications usually serve to remove the mites.—G. J.

Schnelle, G. B., & Jones, T. C. (1944). **Occurrence of the Cereal Mite in War Dogs.**—*J. Amer. vet. med. Ass.* **104.** 213–214. **2434**

The faeces of dogs fed on cereals infested with Tyroglyphid mites may contain the eggs and immature and gravid forms of the mite. This mite is believed to be harmless to adult dogs.—J. B. Cragg.

See also abstr. **2597, 2598** (control in the U.S.A.), **2540, 2541** (control of flies), **2385** (of *Glossina*), **2542** (of dog ticks), **2389** (*Ixodes ricinus* in Norway), **2543** (mange), **2466** (mites in fodder), **2365** (vectors of tularaemia), **2410, 2411** (of St Louis encephalitis).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Merrill, H. W. (1941). **A Survey of the Incidence of Trichinosis in Northern Utah as Indicated by the Intradermal Skin Tests and Post-Mortem Examination of Diaphragms.**—*Proc. Utah Acad. Sci.* **18.** 59–63. **2435**

The intradermal test for trichinosis, made on 111

persons, gave positive reactions in 12 cases (10·8%). Eighteen human diaphragms were also examined, by the microscopic and digestion methods; in one diaphragm there was present what M. considers to be a calcified cyst and, in another, a larva.

M. stresses the need for a law compelling the cooking of garbage and meat scraps intended for pig feeding, and also the importance of educating the public on the necessity of thoroughly cooking pork and pork products.—G. J.

See also absts. **2462** (lungworm in calves), **2544**, **2545** (anthelmintics), **2573** (technique).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS

[INCLUDING FOWL PARALYSIS]

LANGHAM, R. F., THORP, F., & HALLMAN, E. T. (1944). **Adenoma of the Bovine Bladder.**—*Amer. J. Path.* **20.** 421–427. **2436**

The macroscopic and microscopic appearances of adenomas of the urinary bladder in two cows are described.—E. COTCHIN.

PRIOUZEAU, M. (1943). Etude clinique du lymphosarcome de la portion lombaire de la moelle épinière chez les bovidés. **[Lymphosarcoma of the Spinal Cord in Cattle].**—*Bull. Acad. vét. Fr.* **16.** 238–248. **2437**

Lymphosarcoma affecting the lumbar portion of the spinal marrow is not rare in bovine animals. It is essentially a chronic condition, with a slow course; there is slight weakness in the hindquarters, progressing to locomotor ataxia, and ending in total paraplegia. These disturbances are accompanied by considerable emaciation of the muscles of the hindquarters, with disappearance of internal fat and the onset of a floating kidney. Lesions are typically found in the spinal marrow of the lumbar region, and consist of a complete replacement of nerve tissue for a distance of 20–30 cm., by a light greyish-yellow fatty tissue which is histologically lymphosarcomatous in nature. The neoplastic tissue may grow out from the spinal cord and ensheath the roots of the sciatic nerve.—J. G. C.

MACE, D. L., & MATTHEWS, E. L. (1943). **A Small Round Cell Sarcoma with Extensive Involvement of the Heart of a Dog.**—*Army vet. Bull., Wash.* **37.** 231–236. **2438**

The authors describe a tumour, which they designate a small round-cell sarcoma, involving the myocardium of an 11-year-old Scottish terrier bitch; P.M. and histological findings are detailed. The growth occurred in the right ventricle, and microscopic examination showed the neoplasm to be composed mainly of an undifferentiated mass of small round cells, with occasional multinucleated cells interspersed. Mitotic figures and amitotic divisions were observed, and small areas of necrosis were present.

Enlarged lymph nodes were present in the neck, axillae, and groin but only one was examined microscopically; it showed marked dilatation of the sinusoids which contained pink-staining debris. No tumour cells were present. The liver showed chronic venous congestion, whilst the lungs and blood appeared normal. No other organs are mentioned.

The authors discuss the possible identity of this growth and point out that it does not correspond to Hodgkin's disease. They consider that there is a distinction between lymphosarcoma and small round-cell sarcoma, but state that differentiation is impossible by microscopic examination.—J. G. CAMPBELL.

OLSON, C., Jr., & BULLIS, K. L. (1942). **A Survey and Study of Spontaneous Neoplastic Diseases in Chickens.**—*Bull. Mass. agric. Exp. Sta.* No. 391. pp. 56. [Authors' summary slightly amended]. **2439**

A collection of 384 cases of spontaneous neoplastic disease found in 365 chickens has been studied. Since most of the material was submitted to the diagnostic laboratory of Massachusetts State College, some information was gained on the relative incidence of neoplastic disease among birds submitted for necropsy. An incidence rate of 12·9 per cent. for neoplastic disease was found in 2,304 chickens over six weeks of age that were examined in the laboratory.

Twenty-five different kinds of neoplasms were found. Lymphocytoma was the most common and accounted for 55·5 per cent. of the 384 cases. Six other varieties (leiomyoma, embryonal nephroma, myelocytoma, leucosis, epithelioblastoma, and fibrosarcoma) accounted for 33 per cent. of the tumors. Each of the varieties is described and the data compiled for study. The incidence of neoplasia was studied in relation to various factors, such as age at necropsy, sex, seasonal occurrence, and breed. Each of these appeared to be of significance in one or more types of tumor.

The data on lymphocytoma provided a basis for a possible explanation of the different forms of this disease. Other neoplasms, on which new information of significance was found, were leiomyoma, neurogenic sarcoma, and carcinosarcoma.

DALTON, A. J., EDWARDS, J. E., ANDERVONT, H. B., & BRIGGS, V. C. (1943). **A Spontaneous, Transplantable, Adrenal Cortical Tumor Arising in a Strain C Mouse.**—*J. nat. Cancer Inst.* **4.** 329–338. [Authors' discussion copied *verbatim*]. **2440**

The general architecture and the histologic and cytologic evidence support the view that the tumor arose originally from relatively undifferentiated cells of the adrenal cortex. The work of Salmon & Zwemer (1941) indicates that such cells exist in the normal gland since they have shown that new functional cells are continually being formed as a result of the differentiation of the inner capsule cells. The spontaneous adenomas described herein and the nodular hyperplasias described by Woolley, Fekete, and Little regularly arose in a subcapsular position. Gardner (1941) stated that the origin of the hyperplastic cortical tissues in his studies could not be determined accurately but that they appeared to originate in the zona glomerulosa. It is suggested that these adenomas and the adrenal tumor C 199 originated in the same region and from similar cells.

The failure to find any evidence of metastases in the original hosts of later generations of transplants suggested that the neoplasm was relatively benign in character. However, the rapid growth rate attained in later generations plus the evidence of invasion of the capsule by the tumor cells indicated a certain degree of malignancy. For these reasons the tumor has been tentatively diagnosed as a carcinoma of the adrenal cortex of low grade malignancy.

EARLE, W. R. (1943). **Production of Malignancy in vitro. I. Method of Cleaning Glassware. II. Photomicrographic Equipment.**—*J. nat. Cancer Inst.* **4.** 131–133 & 135–145. **2441**

EARLE, W. R., & CRISP, L. R. (1943). **Production of Malignancy in vitro. III. Microcinematographic Equipment.**—*Ibid.* 147–164. **2442**

EARLE, W. R., SCHILLING, E. L., STARK, T. H., STRAUS, N. P., BROWN, M. F., & SHELTON, E. (1943). **Production of Malignancy in vitro. IV. The Mouse Fibroblast Cultures and Changes seen in the Living Cell.**—*Ibid.* 165–212. **2443**

EARLE, W. R., NETTLESHIP, A., SCHILLING, E. L., STARK, T. H., STRAUS, N. R., BROWN, M. F., & SHELTON, E. (1943). **Production of Malignancy in vitro. V. Results of Injections of Cultures into Mice.**—*Ibid.* 213–227. **2444**

NETTLESHIP, A., EARLE, W. R., CLAPP, M. P., & SHELTON, E. (1943). **Production of Malignancy in vitro. VI. Pathology of Tumors Produced.**—*Ibid.* 229–248. **2445**

I. In view of the activity of methylcholanthrene in very small traces, the usual cleaning of glassware with detergents such as soap or trisodium phosphate cannot be relied upon to remove the reagent. Sulphuric acid bichromate solution is not satisfactory in that small amounts of chromium salts are adsorbed onto the glass. In order to overcome these difficulties, E. has devised an apparatus consisting of a steam-jacketed "duriron" bottle into which pure 80% H_2SO_4 is run from reservoirs. To every bottleful of this is added 100 ml. pure concentrated HNO_3. The cleaning solution is heated by steam at 15–18 lb. pressure and can be aspirated back to the reservoirs for re-use.

II. An apparatus has been designed to overcome the difficulty of examining and photographing living tissue cultures at blood heat. The microscope system is inverted and a special stage for holding Carrel flasks has been devised. The microscope is enclosed in a 38°C. air-bath, the camera has bellows extending to 50 in., interchangeable plateholders rotate through 360°, and there is an easily interchangeable source of light with intensity control. A photo-electric exposure meter is incorporated, and there is a system of remote controls for the optical part. The whole is mounted on a heavy lathe bed.

III. Apparatus has been designed to meet the requirements in photomicrography of living tissue culture in fluid medium at 38°C. Paired microscopes are used, so that two cultures can be photographed simultaneously under identical conditions. These are inverted over their respective cameras, and they are enclosed in a constant-temperature air-bath. There is a mechanism for giving exposures varying from 1 frame per sec. to 1 frame per 2 min., and for registering the time of exposure on each frame. The light is on only when an exposure is made, so that a rapid film is necessary. There is an observation ocular between microscope and camera to ensure correct centring and focusing, and the substage is designed to hold both high and low power condensers. Provision is made against vibration, and all controls are within easy reach of the operator.

IV. A strain of fibroblasts from a 100-day-old mouse of the C3H strain was grown *in vitro* for 291 days and then subjected to the action of 20-methylcholanthrene at a concentration of 1 μg. per ml. for varying periods. There was a noticeable decline in the rate of growth of the culture, then at about 40 days the first morphological change was observed. The length of the cell processes diminished and they took on an increasingly amoeboid appearance. The cells formed cell strands, ribbons or sheets showing many characteristics of epithelial tissue in culture. The cytoplasm became very granular. These changes continued after the carcinogen had been removed. The control cultures started to show a similar alteration eight months after the experimental cultures; this was attributed to accidental contamination of the cultures, although how this occurred is not known.

V. It is shown that normal fibroblasts taken from the normal young C3H mouse and grown in a completely heterogeneous culture medium, are progressively altered morphologically when exposed to the action of 20-methylcholanthrene in a concentration of 1 μg. per ml. of culture medium. Such altered cultures gave rise to sarcomas when reinjected into C3H mice.

VI. Sarcomas were produced in normal C3H mice by the injection of mouse fibroblasts which had been treated as in V. They were grossly and histologically similar to previously reported sarcomas either of spontaneous or experimental origin. The cultures exposed to the carcinogen for a short time showed limited invasiveness, slight variability of cell pattern, no giant cells, few abnormal mitoses and no metastases. Those exposed for longer periods showed increased invasiveness, giant cells, abnormal mitotic figures in abundance, and the occurrence of metastasis. Even longer exposures resulted in much variability in cell patterns, numerous giant cells, and great numbers of distorted nuclei and abnormal mitoses. Metastasis was rare and necrosis common. The wide variation in tumour types originating from one original strain of fibroblasts indicates that ideas of the special morphological characteristics distinguishing the various types of human sarcoma may need revision.—J. G. CAMPBELL.

BURK, D., EARLE, W. R., & WINZLER, R. J. (1944). **Production of Malignancy in vitro. VII. Metabolism and Biotin Vitamin Content of Tumors Produced.**—*J. nat. Cancer Inst.* **4.** 363–372. [Authors' summary copied *verbatim*]. **2446**

Seven strains of transplanted sarcomas, derived from mouse subcutaneous fibroblasts which had been subjected to various dosages of 20-methylcholanthrene in tissue culture, were found to possess a metabolism highly characteristic of malignant tumors generally, with respect to all criteria tested, including anaerobic glycolysis, aerobic glycolysis, respiratory quotient, oxygen consumption, oxidation reserve (increase in oxygen consumption on addition of succinate or paraphenylenediamine), Pasteur effect, Meyerhof quotient, extent quotient, and fermentation excess. The biotin and miotin contents of these tumours of in vitro origin were likewise typical of values found in malignant tumors of in vivo origin, whether spontaneous or induced.

The metabolism of the seven strains of tumors was qualitatively and quantitatively very similar. Analysis of the data indicated, however, a rough, second-order correlation between minor differences in the anaerobic glycolysis values of the tumors and previously reported differences in growth rates and inoculation responses of the original tissue cultural strains. Lowering the pH of the medium containing the tumor tissue slices caused a considerably greater decrease in anaerobic glycolysis in the case of the three least altered strains, HW, D and H, as compared with the four most altered tumor strains, J, L, N, and O. This suggests that a more specific correlation between degree of malignancy and ability to glycolyze might be obtained at pH values considerably below that of blood, but closer to those that probably prevail within the tumor intercellularly.

BAIN, J. A., RUSCH, H. P., & KLINE, B. E. (1943). **The Effect of Temperature upon Ultraviolet Carcinogenesis with Wave Lengths 2,800–3,400 Å.**—*Cancer Res.* **3.** 610–612. [Authors' summary copied *verbatim*]. **2447**

The effect of temperature on ultraviolet carcino-

genesis with wave lengths 2,800–3,400 Å was investigated, and it was found that the production of tumors was more efficient at 35–38°C. than at room temperature. There was little difference, however, in the rate of carcinogenesis at 3–5°C. and at room temperature.

WARREN, C. O. (1943). **Tissue Metabolism Studies on Bone Marrow. Consideration in Relation to Tumor Metabolism.**—*Cancer Res.* **3.** 621–625. [Author's summary copied *verbatim*]. **2448**

Bone marrow respiration and glycolysis have been reviewed with particular reference to eight criteria of a tumour type of metabolism listed by Burk. Myeloid, but not erythroid cells, fulfill seven of the eight criteria —only the relatively high R.Q. (about 0·96) serves to distinguish these cells metabolically from malignant cells. The succinate and *p*-phenylenediamine tests of Craig, Bassett and Salter appear not to be of value in this connection and their general applicability is questioned. Also, more evidence is presented to support the view that growth and glycolysis are not necessarily related. The implications of these studies with reference to the metabolism of leukemic cells is discussed.

*VERGE, J., & DRIEUX, H. (1941). Les leucoses des mammifères. **[Mammalian Leucoses].**—*Rec. Méd. vét. exot.* **117.** No. 4/5. [Abst. from abst. in *Schweiz. Arch. Tierheilk.* **85.** 259]. **2449**

Leucosis in domestic animals is rare in France and in the mountainous parts of Switzerland. The disease is more common in some parts of Germany and the probable incidence among cattle in Saxony is 1%. The disease is less common in the pig, dog and horse and extremely rare in the sheep and goat. Whereas leucosis in man is usually of the myeloid type, the disease in animals is almost always lymphoid.

The course is chronic and death results after 3–12 months or longer. Cases of true leucosis are always fatal. The early signs are indefinite—asthenia, capricious appetite, loss of weight—and the characteristic enlargement of lymph nodes appears later. Splenomegaly is a constant feature and the organ may become enormous (10 kg. in the dog, 20 kg. in the pig). Diagnosis is not difficult in cases which take a typical leucaemic course—lymph node enlargement, hepato- and splenomegaly, anaemic and leucaemic blood picture, absence of pyrexia. In all species it is necessary to distinguish the condition from glandular TB.—E. G. WHITE.

SCHILLER, W. (1943). **Local Myelopoiesis in Myeloid Leukemia.**—*Amer. J. Path.* **19.** 809–837. **2450**

In this article, S. discusses the two theories offered to explain extra-medullary myelopoiesis. The first assumes that the myelopoietic foci have a local origin. This is the more likely when such foci are located in organs which have a haemopoietic function in foetal life. Further evidence is provided from certain experiments in animals in which vascular endothelium, perivascular adventitia cells, and undifferentiated mesenchymatous cells have been transformed into undifferentiated lymphoid cells or haemocytoblasts after stimulation by injection of dead bacteria or poisons.

The second theory postulates a haemotogenous immigration of immature bone-marrow cells which enter the circulation. This process is similar to metastasis, but the term "metastasis" is avoided in order to avoid a possible analogy between leucaemic blood cells and malignant neoplastic cells. The term "colonization" is preferred.

A description of a case of chronic myelogenous leucaemia in a woman is given in which evidence in favour of local origin of extra-medullary myelopoiesis is presented.—D. L. HUGHES.

CLAUDE, A. (1944). **The Constitution of Mitochondria and Microsomes, and the Distribution of Nucleic Acid in the Cytoplasm of a Leukemic Cell.**—*J. exp. Med.* **80.** 19–29. [Author's summary copied *verbatim*). **2451**

1. Rat tumor extracts, containing chiefly the cytoplasmic constituents of leukemic cells, were fractionated into three main portions, the different components separating in the centrifuge according to size.

2. Mitochondria were isolated by centrifugation at relatively low speed. Elementary composition of purified mitochondria was found to correspond to about 11·5 per cent nitrogen, 1·6 per cent phosphorus, and 27 per cent lipids. Phosphorus and nitrogen content of the lipid portion suggests that as much as 75 to 80 per cent of the lipids of mitochondria is represented by phospholipids. Tests for ribose nucleic acid were positive.

3. Microsomes were separated by means of centrifugation at 18,000 × *g*. A relation between the high phosphorus content of the microsomes and the marked basophilia of the cytoplasm of leukemic cells is suggested.

4. Phosphorus distribution in the tumor extract, and light absorption analysis of the third fraction, seem to demonstrate that nucleic acid was not present either in a free condition, or in the form of nucleoprotein of relatively low molecular weight. The nature of the results suggests that ribose nucleic acid occurs in the cytoplasm of leukemic cells only in association with formed elements of relatively large size, namely microsomes, and mitochondria.

FRIEDEWALD, W. F. (1944). **Certain Conditions Determining Enhanced Infection with the Rabbit Papilloma Virus.**—*J. exp. Med.* **80.** 65–76. [Author's summary copied *verbatim*]. **2452**

The infection of normal or hyperplastic rabbit skin with the papilloma virus can be greatly enhanced by protecting the scarified and inoculated area with a layer of paraffined gauze until healing occurs. In this way the necrosis which follows upon scarification and also the scabbing are almost entirely prevented and in consequence epithelial regeneration is usually complete within 24 hours. Not only are many susceptible cells provided to the virus far earlier than would otherwise be the case—and collateral tests have shown that it becomes associated with them within a few hours instead of after many—but the inoculum is itself conserved, instead of becoming largely lost amid necrotic tissue and scab, as under ordinary circumstances. The effective titer of the virus is increased by the procedure from 10 to 100 times over that attained when hyperplastic skin is allowed to dry after inoculation. Since the results under the latter circumstances are 10 to 100 times better than those when normal skin is treated in the same way it follows that a 100- to 10,000-fold increase in the effectiveness of the virus has now been obtained.

DURAN-REYNALS, F. (1943). **The Infection of Turkeys and Guinea Fowls by the Rous Sarcoma Virus and the Accompanying Variations of the Virus.**—*Cancer Res.* **3.** 569–577. [Author's summary copied *verbatim*]. **2453**

About 80% of turkeys within the first ten weeks after hatching were found to respond to intravenous injections of Rous sarcoma virus and the same was true for guinea fowls within the first five weeks of life. When cell suspensions were injected the incidence of tumors rose to 100 and 88 per cent respectively. A few adult pheasants injected with cells proved also to be highly susceptible, while newly hatched or older pigeons were found wholly refractory to both virus and cells.

The tumors induced were maintained through 4 passages in turkeys and 6 in guinea fowls by inoculation of tumor extracts or cell suspensions, but the growths were less vigorous, especially when older animals were injected. Both original and transplanted tumors in guinea fowls and in most turkeys were but slightly viscid, very collagenous, and had a pattern approaching that shown by the duck variants of the Rous virus.

The tissue affinities of the viruses were also characteristic. Frequently in turkeys and occasionally in guinea fowls periosteal and endosteal tumors developed, and in the latter hosts the spleen and liver were always typically and almost exclusively involved.

The species affinities of the virus were not modified by the adaptation of the tumors to the new species as was the case in ducks. The viruses of the turkey and guinea fowl tumors regularly infected adult chickens but they showed in these hosts the same tissue affinities, periosteum and endosteum, and induced collagenous tumors much as in their respective homologous hosts. The disease in chickens showed other features in addition whereby it could be differentiated from that induced in them by the original Rous virus.

It is concluded that the virus of the Rous sarcoma of chickens has undergone variations in turkeys and guinea fowls and the characteristics of these variants are discussed, especially in their relation to the duck variants previously obtained.

MILFORD, J. J., & DURAN-REYNALS, F. (1943). **Growth of a Chicken Sarcoma Virus in the Chick Embryo in the Absence of Neoplasia.**—*Cancer Res.* **3.** 578–584. [Authors' summary copied *verbatim*]. **2454**

The virus of the Rous sarcoma of chickens injected intracelomically or intravenously into a total of 132 three, six, and thirteen day chick embryos multiplied in 64 of these hosts without eliciting tumors, but produced haemorrhagic lesions in all 64 analogous to those previously described in chicks.

These lesions were serially transmitted to other embryos in 6 successive passages, again without induction of neoplasia.

The injection of extracts of these lesions, however mild, into chicks and pullets resulted in tumors of the ordinary type, but embryos in which no lesions developed apparently contained no transmissible virus.

Tumors in the chorioallantois developed in only 2 of the 64 embryos that developed lesions. Thus such growths may coexist with typical haemorrhage alterations in the embryo proper.

Microscopic study of the haemorrhage lesions disclosed the presence of destructive changes in the vessel wall and adjacent connective tissue and confirmed the absence of neoplasia.

See also absts. **2470** (liver carcinoma), **2593** (treatment of malignant warts).

DISEASES, GENERAL

—. (1944). **A Provisional Classification of Diseases and Injuries for Use in Compiling Morbidity Statistics by the Committee on Hospital Morbidity Statistics.**—*Spec. Rep. Ser. med. Res. Coun.* No. 248. pp. 168. London: H.M. Stat. Off. [8vo]. [3s.]. **2455**

A Committee on Hospital Morbidity Statistics was appointed by the Medical Research Council at the request of the Ministry of Health to advise on a system for collecting and recording statistics of patients admitted to hospital, a standard classification of diseases and injuries being used. The resulting scheme is comparable with the International List of Causes of Death, the Diagnosis Code of the United States Public Health Service, and the Diagnosis Codes of the Royal Navy, Army, and R.A.F. Medical Services. The scheme is at present only provisional and may require considerable modification in the light of experience. It has already been adopted by the Ministry of Health for the Emergency Medical Service Records and by the Ministry of Pensions, and will be used by the Regional Bureaux of Health and Sickness Records established by the Nuffield Provincial Hospitals Trust.

The main sections of the report consist in introduction and coding rules, classification of diseases and injuries, therapeutic classification (operations, anaesthesia, non-operative therapeutic methods), and classification of occupations (959 headings).

Owing to the provisional nature of the classification no index has been provided.

If large regional health centres for animals are eventually established, a classification of injuries and diseases would be essential for adequate recording. The M.R.C. classification, modified and simplified, might well be suitable for this purpose.—E. G. WHITE.

CHITTY, H. (1943). **Canadian Arctic Wild Life Enquiry. 1941-42.**—*J. Anim. Ecol.* **12.** 163–172. **2456**

A continuation of the series already noted [*V. B.* **14.** 17]. During 1941–42, Arctic foxes were increasing or abundant almost everywhere throughout the Arctic and Sub-Arctic except for the west coast of Hudson Bay, where the numbers had fallen very rapidly since the peak period of 1940–41. On this same coast lemmings also had "crashed", as had snowy owls. Elsewhere lemmings were mostly on the decline. Sledge dogs were generally free from epizootics.

—A. N. WORDEN.

BOLLIGER, A. (1943). Über die Behandlung des Dummkollers der Pferde. **[Treatment of "Dummies" in Horses].**—*Schweiz. Arch. Tierheilk.* **85.** 327–340. **2457**

"Dummies" (*Dummkoller*) in horses is not due to increased fluid in the ventricles but to swelling of the brain substance. A somewhat similar condition is associated with tumours, inflammatory conditions, cholesteatomas and echinococci. "Dummies" responds to treatment by drugs that increase salivary and gut activity and it can be differentially diagnosed from the condition due to other types of lesions.

B. differentiates *Dummkoller* from *Schlafkoller* [see DEHNER—*V. B.* **5.** 442.], in the latter condition the animal being predominantly sleepy.

The treatment of two cases of "dummies" is described in which 0·05 ml. of arecoline was given on each of six consecutive days, the water supply being restricted. Both cases recovered. B. ascribes the success of this treatment to a dehydration of the brain with consequent diminution of the volume of the brain substance.—D. L. ROBARTS.

BECKER, E. (1943). Die Zahnleiden des Pferdes und ihre Behandlung nach Berichten aus 15 Heimat-Pferde-Lazaretten. **[Dentistry in 15 Horse Hospitals].**—*Z. Veterinärk.* **55.** 309–315. **2458**

In these hospitals, veterinary inspection is now begun with an examination of the teeth of all patients. Altogether 9,388 horses were given treatment, including 540 dealt with at the Army training clinic in Berlin during the time covered by this report. The records of the hospitals show that very few horses have perfect

mouths. On the whole, the defects are only slight, and were in no case due to faulty formation of the mouth, but to bad management or wrong feeding. In as far as these faults were due to deficiencies in diet, they could be corrected and prevented from recurring.

One conclusion of the survey is the outstanding importance of dental inspection of army horses, because it enables their diet to be evaluated and corrected, in cases where it has not been so deficient as to cause other recognizable symptoms such as emaciation and exhaustion.—O. CRUSE.

FRONING, B. (1943). Beobachtungen über ein Schlammekzem an den Gliedmassen des Pferdes. [**" Mud Eczema " of the Legs in Horses**].—*Z. Veterinärk.* **55.** 270–271. **2459**

A brief note on " mud eczema ", which appeared during the long muddy period in the spring of 1943 on the German eastern front, in swamp areas. It is surmised that substances in the mud (tannic acid is suggested) may affect the skin so that pathogenic micro-organisms are able to penetrate. Recovery follows quickly when the muddy conditions cease.—O. CRUSE.

*PUGET. (1942). Eczéma végétant sous-ongulé des solipèdes et allergie tuberculinique. [**Pododermatitis of Horses and Tuberculin Allergy**].—*Thesis, Toulouse.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 121]. **2460**

P. investigated the claims of several authors who connected pododermatitis (canker) with skin TB. MAYER (1928) claimed that horses affected with pododermatitis reacted to tuberculin and that, as in TB., the reaction tended to fade in long-standing infections. In an examination of 11 affected horses, P. was unable to find evidence to support these views.—R. M. ARNOLD.

*MILLER, G. (1941). Contribution à l'étude des lésions traumatiques de la corde fémorométatarsienne du cheval. Etude spéciale de la distension de cette corde. [**Traumatic Lesions of the Superficial Digital Flexor in the Horse with special Reference to Sprains**].—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 121]. **2461**

A detailed clinical study of five cases of injury to the superficial digital flexor.—R. M. ARNOLD.

BRITTON, J. W. (1944). **A Disease Complex in Calves on the North Coast of California.**—*Cornell Vet.* **34.** 30–37. **2462**

It is reported that calves could not be successfully reared in this area ; losses averaged 20–50% of the crop, and there was a high incidence of stunting and subsequent sterility in the survivors. Lungworm (*Dictyocaulus viviparus*) infestation together with various subclinical conditions appeared to be responsible for a fatal disease complex, including parasitic gastritis, calf pneumonia and, it is stated, malnutrition. The farms contain two types of pastures, swampy coastal meadows and steep hill grazings, and the annual rainfall averages 85 in. Disease began to appear in the early summer and reached a peak in the autumn, subsiding after the first frosts. The practice had been to move the calves from the hills to the coastal meadows following the midsummer hay harvest.

132 calves of the 1943 season's crop, showing marked symptoms, were treated with phenothiazine, the ration was improved, and they were moved from the coastal to the hill pastures, where the much better drainage might be assumed to have a controlling effect on the lungworm infestation. There was a negligible proportion of deaths, as compared with those on the same farms in the previous two seasons, though the survivors remained stunted and with a tendency to sterility. Five untreated controls all died.

As a trial, 100 calves in these herds were kept off the waterlogged coastal grass altogether, given supplementary feeding when the hills began to be grazed bare, and dosed with 15 g. phenothiazine at 6 and 12 months old. The results were spectacular, while calves of neighbouring farms were as poor as ever. Importation of heifers to this area is not recommended, as there is evidence suggesting that the immunity enjoyed by local older animals is acquired during calfhood infection. A very light infection is acquired under the suggested control regime, believed to be sufficient for the development of this immunity.

No evidence is given concerning a suggestion that nutritional deficiency may be involved in this condition.—F. L. M. DAWSON.

KIMURA, T., & NIIMI, D. (1939). **Histological Changes of the Central Nervous System in So-Called " Lumbar Paralysis " of the Sheep in Chosen.**—*Trans. Soc. path. japon.* **29.** 466–470. [In Japanese]. **2463**

The authors observed a large number of animals affected by this condition which, in its acute form, causes the death of the animal in about a month. Naked-eye examination of the cerebrospinal region of the affected animals revealed only a slight congestion of blood in the meninges ; in the cerebral matter itself, small, scattered petechiae were present, but otherwise nothing unusual was seen. Histological changes could only be recognized during an examination of the meninges where the authors found, besides congestion of blood and an occasional haemorrhage, round cells which had reached the meninges by infiltration. Small " kernel-like ", single, eosinophilic cells were also occasionally encountered. In the cerebral matter, histological changes were characterized by the infiltration of cells from the walls of blood vessels and by such changes as the tendency of the tissue to become soft and spongy and to disintegrate, etc. Histological changes in the medulla were usually similar to those observed in the brain, also clearly indicating a softening process of the tissue. It was finally observed that different regions of the brain exhibit different degrees of disintegration. The article contains a bibliography.
—E. R. PARISER.

CHARTON, A. (1943). Dermatoses et hormones sexuelles chez le chien. [**Dermatoses and Sex Hormones in the Dog**].—*Rec. Méd. vét.* **119.** 65–69. **2464**

A general discussion on the relation of the sex hormones and dermatoses in the dog, based on the reports of KOSTNER [*V. B.* **8.** 667.] and of WITZIGMANN [*V. B.* **9.** 642]. No new observations are made.
—N. J. SCORGIE.

STOREY, C. H. (1944). **Tuberculosis and Goitre.**—*Amer. Rev. Tuberc.* **49.** 323–331. [Spanish summary]. [Author's English summary copied *verbatim*]. **2465**

1. A review of the literature shows that most observers agree that an enlarged thyroid gland indicates a favourable prognosis in cases of tuberculosis.

2. This observation was supported by the foregoing study.

3. Facts were presented to suggest that the development of a diffusely enlarged thyroid, met with in 14 per cent of tuberculosis patients, bears causal relationship to heredity, regional influences, race and sex.

4. The observations led to the tentative conclusion that an individual with diffusely enlarged thyroid gland has an increased susceptibility to tuberculosis as well as an increased resistance to the progress of the disease

SPENCER, G. J. (1943). **A Note on Mites (Acarina) and Aspergillus (Fungous) in Baled Mouldy Hay.**—*Proc. ent. Soc. B.C.* **40.** 9–10. **2466**

S. records an outbreak of disease among a large number of cattle which had been fed on a consignment of mouldy hay. The main symptom noted was violent coughing, which subsided within a few days after the fodder was changed. The hay was swarming with mites of nine species and with *Aspergillus* spp., and these latter were assumed to have been responsible for the respiratory distress.—G. B. S. HEATH.

LECOT, J. A. (1942). Las " Stipeae " en inspección de carnes. **[Importance of the Awns of *Stipa* Grasses in Meat Inspection].**—*An. Fac. Med. vet. Univ. La Plata.* **5.** 148–159. **2467**

The sharp rigid awns of *Stipa neesiana* have the ability to penetrate the relatively fine skin of young lambs, and to set up irritation in the underlying connective tissue and muscles. Often they carry in pathogenic organisms which give rise to inflammatory reactions, varying in severity with the organism concerned. The skins of the lambs are greatly depreciated in value when there are many of the awns passing through them, and the flesh is rendered unfit for export.

It is stated that the wounds caused by the awns play a predisposing role in the aetiology of caseous lymphadenitis.—ISOBEL W. BROCKLEHURST.

—. (1944). **Discussion on Infective Hepatitis : Recent Field Investigations.** [Speakers : LISNEY, A. A., FORD, J. C., NEWMAN, J. L., DAVIS, E., & SPOONER, E. T. C.]—*Proc. R. Soc. Med.* **37.** 165–172. **2468**

LISNEY discussed the epidemiology of a total of 1,062 human cases of infective hepatitis investigated in Leicestershire, including 45 cases previously recorded by T. M. MONTFORD in 1934. The 1,017 cases recorded between 1936 and the middle of 1943 are believed to represent about 80% of all cases occurring during that period. It is concluded that there were two distinct types of local outbreaks, one in which a number of cases occurred within a short period of time, and another in which the incidence extended over a much longer period. Milk, water, solid food, or vermin could not be incriminated as means by which infection was spread. The clinical features throughout the whole series of cases were remarkably constant, but hitherto unrecorded pancreatic complications, including diabetes, are believed to have occurred in some instances. The average incubation period was four weeks, and infection is believed to have been spread by close personal contact probably by droplet infection.

SPOONER reviewed the 1942 epidemic of hepatitis in the Middle East. Officers were nearly five times as susceptible as men, and both Indian and Maori troops, while not immune, were far less frequently affected than Europeans. Certain factors, *e.g.* the fact that rarely more than one member of a tank crew was affected, tended to cast doubt on the hypothesis of droplet infection. Apart from the fact that flies were prevalent, no real evidence was obtained of spread by an insect vector, and the length of incubation was not determined.—ALASTAIR N. WORDEN.

MACCALLUM, F. O., & BAUER, D. J. (1944). **Homologous Serum Jaundice. Transmission Experiments with Human Volunteers.**—*Lancet.* **246.** 622–627. **2469**

All attempts to transmit an infective agent from cases of " homologous serum jaundice " in human beings to mice, rats, g. pigs, hamsters, rabbits, and monkeys were unsuccessful. Evidence was obtained from experiments with human volunteers, however, that an icterogenic agent was present in the blood of a presumed case of the disease seven days after the onset of jaundice. No such agent was demonstrated 66 or 141 days after the appearance of jaundice.

A batch of yellow-fever vaccine containing pooled human serum, and the same serum inoculated alone, both produced jaundice in 30–40% of volunteers of different ages. Some of the remaining volunteers so inoculated showed evidence of liver damage although they did not become icteric.

The icterogenic agent survived heating at 56°C. for one hour and also storage for 14 months in the dried state. From experiments on only two volunteers, it is very cautiously stated that the results are not inconsistent with the view that the icterogenic agent is capable of multiplying in tissue culture.—A. N. W.

KARSNER, H. T. (1943). **Morphology and Pathogenesis of Hepatic Cirrhosis.**—*Amer. J. clin. Path.* **13.** 569–606. **2470**

This is an excellent review of the morbid anatomy and pathogenesis of cirrhosis in man. The term " cirrhosis " should be applied only to the liver. Perhaps the best concise definition of the condition is that given by MOON, *viz*, a progressive chronic inflammation, diffuse in extent, accompanied by fibrosis, retrogressive changes in the parenchymal cells, and proliferation of remaining cells in the direction of regeneration. This definition makes it possible to include as true cirrhosis the following types : Laennec's cirrhosis (atrophic cirrhosis), fatty cirrhosis, pigmentary cirrhosis, and biliary cirrhosis (including xanthomatous cirrhosis and parasitic cirrhosis due to *Clonorchis sinensis*). There is some doubt as to whether post-necrotic (toxic) cirrhosis and congestive (cardiac) cirrhosis should be included. Syphilitic changes should not be termed cirrhosis. Neither TB. nor any other granulomatous disease produces true cirrhosis. Hanot's hypertrophic cirrhosis is probably a form of intrahepatic biliary cirrhosis. Opinions differ as to the relation of cirrhosis to primary carcinoma of the liver : K. states that he has never seen carcinoma of the liver without some degree of cirrhosis of the Laennec type. There are 86 references.—E. G. WHITE.

CHRISTIE, R. V. (1944). **Emphysema of the Lungs.**—*Brit. med. J.* Jan. 22nd. 105–108, & Jan. 29th. 143–146. **2471**

This is an abridged account of the Goulstonian Lectures delivered before the Royal College of Physicians in March 1943. The emphysema considered is that known as chronic vesicular or hypertrophic ; acute, senile, and localized emphysema are probably separate and distinct entities. The emphysematous lung becomes deformed in at least three ways :– (1) many air sacs are misshapen and the alveolar ducts are dilated ; (2) the inter-alveolar septa may disappear, resulting in the formation of very flimsy air sacs or bullae which are easily compressed or dilated ; (3) the amount of air in the lungs is usually increased, but the increase is not proportional to the severity of the disease and the volume of the emphysematous lung is never as great as that of the normal lung after a deep inspiration and the lungs are therefore never overstretched or overdistended. By determining the intrapleural pressure, C. has measured the elasticity of the lungs in emphysematous patients during life and he considers that loss of elasticity is the primary lesion in this condition. Most of the signs and symptoms of emphysema, as well as the distension of air sacs and formation of bullae, can be explained on the basis of loss of elasticity. The common cause of this loss of elasticity is the stress and strain of chronic cough or respiratory obstruction (asthma).

Although most text-books quote glass-blowing and the blowing of wind instruments as causes of emphysema, there is ample evidence that no such aetiological relationship exists. The original statement of LAENNEC, made in 1819 and not based on any actual cases, has merely been copied from one book to another for 120 years.

The various theories which have been advanced to explain the dyspnoea which occurs in emphysema are considered and each in turn rejected. The explanation which C. advances is that much of the inspired air is deflected into the enlarged air sacs and bullae, the walls of which are avascular and thus play no part in respiratory exchange. On this basis dyspnoea would be due to wastage of ventilation on this " pathological dead space ".

It should be added that C. has made several valuable contributions in this field during the past ten years.—E. G. WHITE.

COTCHIN, E. (1944). **Marie's Disease (Hypertrophic Pulmonary Osteo-Arthropathy). Two Further Cases in the Dog.**—*Vet. J.* **100.** 45–47. **2472**

A description of two cases of generalized osteoarthropathy in the dog, one associated with pulmonary TB. (probably human type), the other with a nodular lung lesion the nature of which could not be determined (neoplasm or granuloma).—E. G. WHITE.

BOURNE, G. H. (1944). **The Relative Importance of Periosteum and Endosteum in Bone Healing and the Relationship of Vitamin C to Their Activities.**—*Proc. R. Soc. Med.* **37.** 275–279. **2473**

Healing and regeneration of injured bone were studied in rats and g. pigs by boring small holes in the femora and in the parietal region of the skull and killing the animals at intervals varying from 24 hours to two weeks later. After 24 hours the blood clot at the site of injury had been invaded by fibroblasts from the periosteum and marrow and signs of fibrous organization were evident. At the end of three days most of the blood cells had been removed and had been replaced by collagen and pre-collagenous material. At the same time the inner cellular (cambial) layer of periosteum had proliferated and the outer fibrous layer had begun to grow over the fibrous callus. The first bony trabeculae were seen arising in association with the endosteum. At four days the collagenous material formed by the periosteum was being transformed into cartilage. Formation of membrane bone occurred first from the endosteum and not until the original injury had been sealed off by the endosteum did periosteal bone formation occur.

B. has previously shown that in the g. pig deficiency of vitamin C causes deficient production of trabeculae in experimental bone injuries. The activity of both periosteum and endosteum is impaired. The endosteal cells become oedematous and formation of osteoid trabeculae is retarded. The cambial layer of periosteum fails to react by proliferation and collagen formation, and the fibrous layer does not extend and cover the site of injury.—E. G. WHITE.

*WEHMANN, F. (1941). Künstliche Besamung bei geschlechtskranken Kühen und Färsen. **[Artificial Insemination of Cows and Heifers affected with Genital Disorders]**.—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 14]. **2474**

Artificial insemination was carried out on 62 cows and heifers with functional or organic abnormality of the genital organs and 25 became pregnant. In only 30, however, was there certainty that first quality sperm was used, and the follicle not ruptured immediately before insemination. Of these 30 animals 21 became pregnant. The indications for artificial insemination are :– vestibulitis, inadequate oestrus, featureless infertility, and " pneumovagina ". In cervicitis, endometritis and anomalies of the cervix, treatment should be followed by natural mating ; recovery may occur without treatment.—J. A. LAING.

PRIOUZEAU, M. (1943). Dystocie par kystes vaginaux multiples chez la truie. **[Dystokia in the Sow due to Multiple Vaginal Cysts]**.—*Rec. Méd. vét.* **119.** 10–13. **2475**

A clinical description is given of a type of dystokia occurring in pigs, characterized by eversion of the vagina immediately before or during parturition, due to violent expulsive efforts arising from the presence in the vagina of numerous voluminous " cysts ". The condition has been seen only after the third or fourth gestation period. The " cysts " are finger-like, rounded, or grape-like projections of the vaginal mucosa, and tend to occur in a zonal band, and not along the whole length of the vagina. They are fibrovascular structures, infiltrated with a yellowish oedematous fluid, which apparently increase rapidly in size about the time of parturition and act as obstructing and irritant foreign bodies. Methods of dealing with the dystokia are described in detail, and consist essentially of repulsion of the vagina and manual delivery of the foetuses. Affected swine tend to show an increase in number and size of the " cysts " at successive gestations, and it is therefore recommended that they be fattened off for the butcher.—E. COTCHIN.

*ROUSSELOT, J. (1942). Contribution à l'étude des métrites chroniques des carnivores domestiques. **[Chronic Metritis in Domesticated Carnivora]**.—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 62]. **2476**

Attempts were made to induce experimental metritis, (1) by inoculating cultures of bacteria from naturally affected genitalia, negative results were obtained, and (2) by repeated injections of oestrogens, symptoms were occasionally produced. In field clinical cases, ovarian lesions such as cysts or tumours were a common accompaniment. VITA is quoted as having correlated " flare-ups " of uterine inflammation with the appearance of fresh corpora lutea.

These facts are considered to account for the endocrine type of symptoms—oestral irregularities and an adiposo-genital syndrome—which in many cases accompany histopathological uterine changes. On these grounds, gonadotropic hormone therapy is indicated, and in practice it is considered to give successful results in 90% of cases; in the remaining 10% uterine lesions, such as neoplasms, have generally progressed too far to resolve and in these cases ovariectomy or hysterectomy is advocated.—F. L. M. DAWSON.

HJÄRRE, A., & NORDLUND, I. (1942). Om atypisk amyloidos hos djuren. **[Atypical Amyloidosis in Animals]**.—*Skand. VetTidskr.* **32.** 385–441. [English and German summaries]. **2477**

The authors suggest that amyloidosis in animals can be classified into typical generalized, atypical generalized, and intermediate types. The typical generalized type is that which follows the experimental parenteral administration of a foreign protein, observed for instance in horses used for the preparation of tetanus or diphtheria antisera. In this type, the predilection sites are the spleen and liver of the horse, cat, fowl and mink, the kidneys and adrenal glands of the ox, and the kidneys of the dog. The deposits are extensive and polychromatic and signs of resorption are absent. In

atypical generalized amyloidosis, those organs not involved in the typical form are chiefly affected. The deposits are extensive but lobular in form and either hypo- or achromatic. Resorption is often observed. In the intermediate type, the chief deposits occur in an unusual site, whilst the usual organs remain slightly or not at all affected.

Three forms of the atypical generalized disease, observed by the authors, are described in the horse. The first and most common is the lymph-node-skin form first described by HJÄRRE [*V. B.* **4.** 670.]; the second involves the respiratory tract, and the third is associated with metastasizing sarcoma. The lymph-node-skin cases were observed in four aged horses from central Sweden. Symptoms appeared in the spring in the form of nodular or plaque-like thickenings of the skin of the neck, upper part of the fore-limbs, chest, and back of the head. There was depilation and a tendency to skin irritation. Regional lymph nodes became enlarged, especially the superficial cervicals and prescapulars. Later, the skin of the neck was thrown into traverse folds and harness galls rendered the animals useless. Diagnosis was made during life by the microscopic examination of an excised portion of diseased skin. This revealed, in addition to amyloidosis, the presence of active blastomycosis of the skin in one horse which reacted to both mammalian and avian tuberculin injected intradermally. The authors attribute this reaction to blastomycosis which they state that HEDSTRÖM believes to be the cause of " skin lesions " in cattle. The naked eye and microscope P.M. features are described in detail. In one animal, a solution of Congo red was injected intravenously and its rate of elimination observed for diagnosis. In amyloidosis the dye is taken up from the bloodstream by the amyloid tissue. Thus the concentration of the dye remaining in the bloodstream of an affected animal diminishes.

The respiratory form was observed in three horses of nine, ten, and eight years old respectively. There were symptoms of blockage of the respiratory system with nasal discharge. The mucous membrane of the anterior part of the nasal cavity exhibited nodular or general thickenings, which in one case involved the nasopharynx, guttural pouches, and larynx, and extensive amyloid deposits were found in both lungs. Deposits occurred in the third eyelids and the conjunctivae. The regional lymph nodes were more or less enlarged. The P.M. findings are described.

In a case observed in a ten-year-old mare, amyloid deposits occurred in association with the new tissue of a metastasizing sarcoma. After foaling, subcutaneous and intramuscular tumours developed which were distributed over the body, and which, on P.M. examination, were found to involve the viscera and to be sarcomatous in nature. Large amyloid deposits were associated with the tumours and occurred in many joint capsules.

An example of the atypical type of amyloidosis is also described in a dog in which lesions were found in the coronary arteries.

The P.M. features of the intermediate type of the disease in a swan and goose are described. In the former, the thyroid glands particularly, together with the liver, spleen, and kidneys, were affected; in the latter, one thyroid was extensively involved and the liver and kidneys less so.

The aetiology of amyloidosis in animals is not clear. Experimentally, the disease can be induced more readily in mice from which the spleen has been removed than in normal mice. It follows the subcutaneous and intravenous introduction of foreign protein into cattle or the intraperitoneal injection of bovine serum into the fowl. Predisposing or co-existent diseases are regularly recognized as precipitating factors in man, but not in animals; thus, a few years ago, amyloidosis affected a number of Russian horses which were found to be free from any other disease condition. On the other hand, amyloidosis occurs in 60–70% of poultry, 40–50% of horses, and 4% of dogs with TB. In the ox, this combination is rare, but it may be associated with chronic mastitis. Diet appears to play a part. Thus a protein-rich but lipoid- and vitamin-deficient diet favours, and a carbohydrate diet inhibits, the development of the condition. The disease is not uncommon in horses, fowls, and oxen, less common in dogs and mink, and very rare in sheep and pigs; it has never been recorded in goats. Some workers postulate that amyloidosis is the result of the interaction of an antibody and antigen. In this connexion, it is recalled that the lymph-node-skin form in the horse is confined to those parts of the body which, being out of range of the tail, are liable to attacks by insects. LITERER & LOESCHKE therefore suggested that a toxin of insect origin sensitizes the host and that at subsequent attacks the insect reinjects the toxin, amyloid tissue being subsequently produced.—G. B. BROOK.

LETARD, E. (1943). Troubles de la locomotion et troubles de la vision chez le lapin. Liaison héréditaire. **[Locomotory and Visual Disturbances of Hereditary Origin in a Rabbit].**—*Bull. Acad. vét. Fr.* **16.** 184–192. **2478**

Breeding experiments are reported with the " acrobatic rabbits " previously described [*V. B.* **9.** 265]. An affected buck was outcrossed to various unrelated does, but none of the progeny was abnormal in respect of gait. The F_2 generation, however, contained about 25% of " acrobats ". The mating of two affected rabbits proved difficult, but in two litters so produced, all seven members of one and the only survivor of the other (which was abandoned by its dam) were typical " acrobats ". The condition, therefore, appears to be due to a simple recessive factor.

" Acrobatic " rabbits were found also to have defective vision, double cataracts sometimes being present. In some cases there was luxation of the lens, and in all pupillary dilatation was marked, and the photomotor reflex was diminished or absent.

—ALASTAIR N. WORDEN.

UBACH, F. A. (1942). Anomalías de organización en los animales domésticos. Polimelias y polidactilias. **[Skeletal Abnormalities of Domestic Animals: Polymelia and Polydactylism].**—*An. Fac. Med. vet. Univ. La Plata.* **5.** 92–128. **2479**

A well illustrated article on supernumerary limbs and digits in domestic animals and birds. An extensive bibliography is provided.—ISOBEL W. BROCKLEHURST.

*GANDON. (1943). Contribution à l'étude des kystes dentifères des animaux domestiques. **[Dentigerous Cysts in Domesticated Animals].**—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 122]. **2480**

G. considered the origin and significance of embryonic tumours. He supported the views of KOLLIKA, LEGROS, MAGITOT, and BARD, that dentigerous cysts arise from a follicular migration and grow around " nodal points ". He considers that teratoma of the internal organs arises parthenogenetically.—R. M. A.

See also abstr. **2590** (diseases of army dogs), **2600** (of rabbits), **2593** (of livestock in Ontario, " stiff lamb " disease), **2579-2585, 2601** (air-borne infection).

NUTRITIONAL AND METABOLIC DISORDERS

*Dorotte, J. (1942). Parésie gastro-intestinale des lapins. [**Gastro-Intestinal Paralysis in Rabbits**].—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 61]. **2481**

The condition is characterized, broadly, by inappetence, constipation, tympany, and a subnormal temperature; it occurs in both sexes, but especially in lactating females, and is to be differentiated both from acute indigestion and from enterotoxaemia due to *Clostridium perfringens*. Treatment was attempted by sodium sulphate or castor oil *per os* and subcutaneous injections of camphorated oil or 20% calcium gluconate. The efficacy of this treatment was not easy to assess owing to the difficulty of differential diagnosis, and to poor co-operation by rabbit-keepers.

Prophylaxis by a correctly balanced diet is considered the best counter-measure. Affected animals were principally those fed very largely on beetroot; the symptoms are due, it is suggested, to a calcium and magnesium deficiency, which most readily becomes apparent towards the end of lactation.—F. L. M. D.

Simon, P. A. (1943). **Hemeralopia.**—*Indian vet. J.* **20.** 126–130. **2482**

Hemeralopia in animals is mainly caused by vitamin A deficiency, working bullocks being most frequently affected. Cases among cows are prevalent in summer, when the pastures are dried up. Administration of red palm oil and fish liver oils leads to rapid recovery, which can be maintained by a proper diet.—S. N. Ray.

Duckworth, J., Godden, W., & Thomson, W. (1943). **The Relation between Rates of Growth and Rickets in Sheep on Diets Deficient in Vitamin D.**—*J. agric. Sci.* **33.** 190–196. **2483**

Two experiments on 54 wether lambs were carried out, both experiments beginning in November of successive years. The animals were housed in pens from which sunlight was excluded. Rations deficient in vitamin D and energy-producing materials but containing sufficient protein, Ca, and P for normal growth were fed. Different rates of growth were produced by supplementing the ration with starch or fat. Since rickets is associated with rate of growth, different degrees of severity were attained by grading the amount of energy supplements supplied. Serum Ca, blood inorganic P, plasma phosphatase, serum inorganic P, and serum phosphatase were estimated. The characteristic change which occurred in the vitamin D deficient lambs was a reduction in serum Ca. The specific effect of the deficiency on the inorganic P was difficult to assess, as considerable fluctuations occurred. The lambs had evidently sufficient reserves of vitamin D to protect them from avitaminosis for about six weeks, as judged by serum Ca levels. After this period, there was a reduction in serum Ca, which increased with greater rapidity of growth. Clinical symptoms and serum Ca values were in good agreement. In animals where the serum Ca did not fall below 7 mg. per 100 ml. and where growth was slow, no rickets occurred. Where there was a moderate degree of growth, rickets appeared and in such cases the serum Ca was 5–6 mg. per 100 ml. Plasma phosphatase values increased in all groups but the increases were progressively greater as the rate of growth increased from group to group.—E. M. C.

See also abstr. **2515** (mineral supplements for livestock), **2473** (vitamin C), **2497**, **2498** (B vitamins in the cerebrospinal fluid), **2520**, **2521** (diet and atebrin toxicity), **2420** (and susceptibility to tetanus toxin).

PHYSIOLOGY AND ANATOMY

I. Kennaway, E. L. (1943). **The Supply of Water to Rabbits and Guinea-Pigs.**—*Brit. med. J.* June 19th. 760. **2484**

II. Hare, T. (1943). **Water for Rabbits and Guinea-Pigs. [Correspondence].**—*Ibid.* July 3rd. 24. [See also absts. 2486-2488, below]. **2485**

I. Two rabbits were placed in separate cages on a dry diet of bran and clover hay. Water was supplied from glass bulbs in the roof of the cages. These bulbs contained 160–170 ml. of water and they were of the type used for laboratory rats. The first rabbit emptied the bulb daily, while the second and smaller rabbit drank somewhat less. The consumption of water per day by each rabbit was about 65 ml. per kg. This is about twice the total intake of water for an average human adult. Eating about 300 g. of fresh green food a day a rabbit would receive about 270 ml. of water from that source, assuming the water content of fresh green food to be 80–90%. The water content, however, varies considerably, and K. considers that water should be supplied to rabbits on such a diet. Rabbits on a very dry diet, besides suffering from a lack of water, also do not eat adequate amounts of their food. K. concludes that the moist food system adopted to avoid supplying fresh water to laboratory animals, is unsound and should be considered obsolete.

II. H. points out that the 19th century "fanciers" were well aware of the need for drinking water for rabbits and g. pigs, and of the importance of drinking receptacles which did not allow the water to become fouled. The work of these fanciers and of such veterinary pioneers as Henry Gray deserve greater acknowledgement.

—D. L. Hughes.

I. Kennaway, E. L. (1943). **Water for Rabbits and Guinea-Pigs. [Correspondence].**—*Brit. med. J.* July 17th. 87. **2486**

II. Wilson, W. K. (1943). **Some Factors Influencing the Drinking Water Requirements of the Rabbit.**—*Vet. Rec.* **55.** 462–463. **2487**

III. Hare, T. (1944). **Drinking Water Requirements of the Rabbit. [Correspondence].**—*Ibid.* **56.** 90. **2488**

[See also absts. 2484-2485, above].

I. A reply to Hare [see 2485 above]. K. suggests that whatever knowledge may be stored in libraries, there is widespread ignorance on the question, which from the humanitarian standpoint is urgent. Hare's statement that the old fanciers recommended about a tablespoonful (*i.e.* 15–21 ml.) of water or milk daily for g. pigs on a dry diet is thought to be at variance with his other exposition, *viz*, that rabbits on dry diets require about one-third of a pint (*i.e.* 190 ml.) water or milk daily, since an adult g. pig, weighing 600–700 g., would be expected to consume about one-quarter the volume drunk by a rabbit, *i.e.* 48 ml. Some of K.'s g. pigs are said to consume much more than 15–20 ml. per day.

II. The water requirements of the rabbit at different stages of life have been determined by W. and by other workers, and it has been shown that the highest requirement is during lactation, varying with size of breed and size of litter.

The problem of whether or not rabbits drink is a separate one, and depends upon the moisture content of the ration. Thus in one experiment quoted, water was found to be unnecessary when the maintenance diet

comprised succulents and hay, but it was needed in increasing amounts as " dry " foods were added to the ration.

An earlier paper by W. is quoted in support of the observation that certain vicious habits (*e.g.* urine drinking or cannibalism) may result from the withholding of water, and that they may be cured when a daily supply of clean water is provided.

III. The article by WILSON [see II] is adversely criticized. The 19th century British fanciers are stated to have found that a rabbit fed entirely on a dry diet requires three tablespoonfuls, or approximately 100 ml. [but according to the standard given in I, this is only 45–63 ml.], of water or milk per day.—A. N. WORDEN.

MOLL, K. (1943). Vergleichende Blutuntersuchungen. Viscositäts- und refraktometrische Bestimmungen des Blutes, Plasmas und Serums von Hunden, Ratten, Gänsen und Enten und vergleichend im menschlichen Blut nebst Hämoglobinbestimmungen. [**Comparative Blood Research. Viscosity and Refractometric Determinations on the Blood, Plasma, and Serum of Dogs, Rats, Geese, and Ducks Compared with Human Blood, together with Haemoglobin Determinations**].—*Pflüg. Arch. ges. Physiol.* **247.** 74–88. **2489**

The mean blood haemoglobin concentration in all the species examined was higher in males than in females. The highest values for haemoglobin content were found in dogs ; the blood of the birds contained less haemoglobin than did the blood of rats and men. The viscosity of the blood was roughly proportional to the haemoglobin content and the viscosity of plasma varied with the protein content. Mammalian plasma contained more protein (6·3–8·1%) than avian plasma (4·4–6·5%). The specific viscosity of the plasma protein is lowest in rats and rabbits. The ratio of haemoglobin to plasma protein was higher in the blood of birds and animals than in the human blood.—E. B.

VAN LOON, E. J., & CLARK, B. B. (1943). **Hematology of the Peripheral Blood and Bone Marrow of the Dog.**—*J. Lab. clin. Med.* **28.** 1575–1579. **2490**

The following determinations were made on the peripheral blood (femoral artery) of 81 mongrel dogs :– haemoglobin, erythrocyte count, cell volume, reticulocyte count, total and differential leucocyte counts. The results are compared with those recorded in the literature. No significant differences were found associated with sex or breed : age was without effect in the case of animals over 10–12 months old.

Bone-marrow smears were prepared from eight dogs immediately after the animals had been killed. Smears from extruded rib marrow were found more satisfactory than impression smears from the femoral marrow. Although the latter probably give a more representative distribution of marrow cells, they are difficult to prepare and do not stain well, and only the peripheral cells can be differentiated accurately.

—E. G. WHITE.

*SZEGI, F. (1942). [**Osmotic Pressure of Blood Corpuscles of Horses**].—*Inaug. Diss., Budapest.* pp. 24. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 519]. **2491**

The minimum value of the osmotic pressure of the blood corpuscles of horses is equal to that of 0·64% sodium chloride, and the maximum to 0·38% sodium chloride. When horses have been doing strenuous work, the osmotic pressure of the blood corpuscles is reduced to 0·02–0·4%. Feeding has no appreciable effect. After working, the amount of haemoglobin which is separable from the blood by haemolysis is increased, since blood corpuscles are set free from the spleen in large numbers.—O. CRUSE.

*SÁNTHA, L. (1942). [**Potassium Content of Blood of Cattle**].—*Inaug. Diss., Budapest.* pp. 16. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 520]. **2492**

The potassium content of the blood of cattle was estimated by the Kramer-Tisdall method, and was found to have a mean value of 56 mg. % in whole blood, 30·52 mg. % in plasma, and 27·45 mg. % in serum, becoming higher at the last stages of separation of serum from whole blood. The critical haemoglobin value and the K content of cattle blood are independent of one another.—O. CRUSE.

*TÓTH, M. (1942). [**The Liberation of Blood Serum Calcium after the Administration of Copper Sulphate**].—*Inaug. Diss., Budapest.* pp. 16. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 520]. **2493**

Free and total calcium values were estimated before and after the administration of copper (as sulphate). After the ingestion of Cu, the amount of bound Ca in serum is decreased, while the amount of free Ca is increased. With low concentrations of protein, the whole of the bound Ca is liberated, although there does not appear to be any particular relation between the amount of bound Cu and of liberated Ca. As the binding of Cu increases, the amount of freed Ca increases but the protein particles appear to play a definite role in the liberation.—O. CRUSE.

WYMAN, J., Jr., RAFFERTY, J. A., & INGALLS, E. N. (1944). **Solubility of Adult and Fetal Carbonylhemoglobin of the Cow.**—*J. biol. Chem.* **153.** 275–284. **2494**

In order to establish whether or not adult and foetal haemoglobins of a single species may be different, the solubility of carbonyl haemoglobin from adult and foetal cow's blood was compared. It was shown that in strong phosphate buffer at pH 6·8 the carbonyl haemoglobin from embryonic blood was more than six times as soluble as that from adult blood.—R. MARSHALL.

GROSSE-BROCKHOFF, F., MERCKER, H., & SCHOEDEL, W. (1943). Zur Frage der Kreislauf- und Atmungsregulation bei exogener Hyperthermie. [**Regulation of Circulation and Respiration in Experimental Hyperthermia**].—*Pflüg. Arch. ges. Physiol.* **247.** 342–352. **2495**

Dogs under morphine-urethane narcosis were overheated in a water bath at 38°–42°C. The alveolar carbon dioxide tension decreased with rising temperature, while the respiration and blood pressure increased. The increase in blood pressure was due to increased sensitivity of the medullary centres.—E. BOYLAND.

WEATHERBY, J. H. (1943). **The Artificial Phospholipid Membrane, Semipermeability, and the Blood-Brain Barrier.**—*J. Lab. clin. Med.* **28.** 1817–1820. **2496**

There exists much information concerning the penetration of the blood-brain barrier [see *V. B.* **14.** 52, abst. 325] by various substances. In general it may be said that those which penetrate to the brain exist at body pH, at least in part, as un-ionized molecules, whereas those which do not penetrate exist largely in the ionic forms. Toxins and viruses which carry a negative charge also fail to penetrate.

W. has constructed collodion membranes containing lecithin and cephalin and shown that weak bases such as nicotine permeate the artificial membrane only when the pH of the solution allows them to exist in the molecular form, *i.e.* permeation occurs from an alkaline but not an acid medium. On the other hand, methyl iodide derivatives of nicotine which ionize in both acid and alkaline solutions do not permeate the

artificial membrane. Further experiments confirmed that the artificial membrane containing lecithin and cephalin was permeable to molecules but not to ions and in general that substances which permeated it also passed the blood-brain barrier when injected intravenously. It is suggested that cell membranes containing phospholipids separating bloodstream and brain substance constitute the so-called " blood-brain barrier ", and that pharmacologic activities of many alkaloids may be increased or decreased between wide limits by relatively slight changes in molecular structure, so that pK is increased or decreased as desired.—J. F.

ABDERHALDEN, R., & ELSAESSER, K. H. (1943). Das Vorkommen von Aneurin und Cocarboxylase im Liquor. [**Occurrence of Thiamine and Cocarboxylase in the Cerebrospinal Fluid**].—*Pflüg. Arch. ges. Physiol.* **247.** 24–33. **2497**

Human cerebrospinal fluid contains small amounts of thiamine (0·2–1·5 g. per 100 ml.) and cocarboxylase (0–0·5 g. per 100 ml.). The concentration of the substances does not vary regularly in diseases of the central nervous system. Following injection of thiamine there is a temporary increase in the concentration. The cisternal injection of thiamine offers no clinical advantages over intravenous or intramuscular injection of the vitamin.—E. BOYLAND.

ABDERHALDEN, R., & ELSAESSER, K. H. (1943). Untersuchungen über das Vorkommen von Lactoflavin, Nicotinsäureamid und p-Aminobenzoesäure im Liquor Cerebrospinalis. [**Occurrence of Riboflavin, Nicotinamide, and *p*-Aminobenzoic Acid in the Cerebrospinal Fluid**].—*Pflüg. Arch. ges. Physiol.* **247.** 325–335. **2498**

Human cerebrospinal fluid contains no riboflavin either as such or in combination. Riboflavin dissolved in cerebrospinal fluid exposed to ultra-violet light is more rapidly destroyed than in aqueous solution. The fluid contains about 70 g. nicotinamide per 100 ml. and the concentration does not appear to vary regularly in nervous diseases. Chemical methods fail to detect *p*-aminobenzoic acid in normal fluid, but it can be detected in fluid following intravenous injection of the acid.—E. BOYLAND.

*SZERAFIN, J. (1942). [**Amino Acid Content of Urine of Horses, Cattle, Sheep, and Pigs**].—*Inaug. Diss., Budapest.* pp. 24. [In Hungarian]. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 521]. **2499**

The average amino-acid content of horse urine was found to be 11·84 mg. % by the formaldehyde method and 11·93 mg. % by the Folin method. The urine of cattle gave values of 11 and 11·26 mg. %, and of sheep, 6·09 and 5·99 mg. %, by the two methods. In pigs, the values were 11·29 and 11·41 mg. % respectively. These values were very similar to those found by STEINMETZER & STRAKOSCH. The presence of triple phosphate probably interferes with the formaldehyde determination. Lactation and the breed, sex, state of nutrition, and age, of the animals do not appear to affect the amino-acid content of the urine.—O. CRUSE.

WHITEHAIR, C. K., & MORGAN, B. B. (1944). **The Hydrogen Ion Concentration of the Preputial Cavity of the Bull.**—*Amer. J. vet. Res.* **5.** 93–95. **2500**

pH determinations were made by means of a glass electrode, encased in a protective bakelite tube $9 \times \frac{5}{16}$ in., and connected to an electrometer by a 6 ft. wire lead. Thirty bulls with normal breeding histories and normal semen (examined microscopically) were used, and readings were taken in three areas of the preputial cavity, one adjacent to the posterior part of the glans penis, one surrounding the galea glandis, and the third in the middle part of the cavity in front of the glans.

Mean values for each area were obtained on seven consecutive days. No significant daily variation was noted, but it was observed that the cavity had a strong tendency to become more alkaline from behind forward, the total average pH figures for the three areas being respectively 6·68, 7·15, and 7·42.—F. L. M. DAWSON.

SCHÄFER, H. (1941). Die physiologischen Verhältnisse beim Gebärakt des Schweines und ihre Beziehungen zu einigen Leistungsäusserungen. [**The Physiology of Parturition in the Sow and its Relationship to Productivity**].—*Z. Tierz. ZüchtBiol.* **48.** 207–254. [Abst. in *Nutr. Abstr. Rev.* **13.** 432–433, copied *verbatim*. Signed : I. LEITCH]. **2501**

Literature is reviewed and original observations recorded for two lines of Veredeltes Landschwein, Berkshires and crosses between the two. The pigs were housed all the year round in huts with outside runs. In summer and autumn the basis of feeding was green feed, clover, lucerne, vetch mixture and beet leaves. In the winter, beet and chaff were fed to appetite and only enough supplementary food was given to ensure the protein requirement. The type of supplement is not stated.

During a period of over 2 years, 91 litters were recorded in detail and the records of 90 are analysed. The general records of the station (370 litters) showed mortality between birth and 4 weeks of age to be from 15·5 to 22·3 per cent. for the different breed groups. In the specially recorded groups, 6·5 per cent. of the Landschwein, and 2·3 of the Berkshire pigs were stillborn. There was a positive correlation between fertility and duration of pregnancy and between number of pigs and time to farrow each. The stillbirth rate increased from 0 with 8·3 pigs per litter and a farrowing time of less than 60 minutes to 16·3 per cent. with 12·3 pigs per litter and a farrowing time of over 8 hours. The average litter order of litters without dead born was 2·9 and of litters with dead born 5·4. Number of pigs per litter and the percentage dead born increased from 9·2 and 2·3 for 1st litters to 13·5 and 10·2 for 5th litters.

SERGENT, ET. (1941). Durée de la gestation chez la femelle de cobaye. [**Duration of Gestation in the Female Guinea Pig**].—*Arch. Inst. Pasteur Algér.* **19.** 78–79. **2502**

Observations on four g. pigs showed the normal gestation period to average 65–70 days. In two other g. pigs the periods between the successive parturitions were found to be respectively 165, 65, 69 and 65 days, and 135, 270, 86 and 68 days.

*PETZOLD, G. (1942). Die neue hormonale Schwangerschaftsdiagnose mit Hilfe des Krallenfrosches Xenopus laevis Daud. · [**The New *Xenopus* Pregnancy Test**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 432]. **2503**

Experiments with *Xenopus* gave unambiguous positive or negative results and in nine cases were more reliable than the Ascheim-Zondek test. The results confirm the work of ELKAN [*V. B.* **9.** 902.] and of LAVES. Elkan gives 4 hours 50 min. as the shortest interval at which egg-laying can commence, Laves 5 hours, and LANDGREBE 18 hours. In these experiments, with a water temperature of 26°–28°C., the interval was 15–20 hours. Unless temperatures below 20°C. are avoided results are weak, delayed, or absent. It is not yet known whether different intervals before egg-laying are connected with the age of the frog or, as less likely, with the time of year.—J. A. LAING.

LANDAUER, W., & ZONDEK, B. (1944). **Observations on the Structure of Bone in Estrogen-Treated Cocks and Drakes.**—*Amer. J. Path.* **20.** 179–209. [Authors' summary copied *verbatim*]. **2504**

Observations on long bones of cocks and drakes, which had been treated with estradiol benzoate, led to the following conclusions :

1. The earliest change consists in an increased vascularization of the shaft of the long bones, accompanied by removal of bone salts (osteolysis).

2. The processes of halisteresis are followed by disappearance of fat from the marrow cavity, increased multiplication of marrow cells and vasodilation in the marrow.

3. After large doses of estrogen the marrow undergoes fibrous degeneration with focal necrosis, production of hyalin within and outside of blood vessels, and eventually the formation of new endosteal bone. Thickening of the walls of small vessels occurred at the same time.

4. There is a definite pattern of response of the various long bones. In the leg the femur shows the greatest changes, the tarsometatarsus the least. Similar patterns of response can be observed with regard to different regions of one and the same bone. These patterns correspond closely to the known differentials of growth activity and blood supply.

5. The skeletal changes after estrogen treatment are slight in Mallard drakes and very pronounced in Pekin drakes, with cocks holding an intermediate position. Young cockerels show a much greater response than mature cocks. The effects are similar in mature cocks and fully grown capons.

6. It is believed that circulatory adjustments initiate the sequence of events which leads to final hyperossification, and that formation of new endosteal bone represents a cicatrization of the degenerating marrow.

JACOBSON, L. O. (1944). **The Effect of Estrogens on the Peripheral Blood and Bone Marrow of Mice.**—*Endocrinology.* **34.** 240–244. **2505**

Large doses (16 μg. weekly for 36 weeks) of oestradiol benzoate were given to male and female mice. As compared with control animals which received no such dose, they showed partial replacement of the bone-marrow cavities by endosteal new bone formation, but any alterations in the blood picture (leucocyte, erythrocyte, platelet, and differential counts, haemoglobin) were only slight.—RACHEL MARSHALL.

SHANKLIN, W. M. (1944). **Histogenesis of Pituicytes in the Chick.**—*J. Anat.* **78.** 79–93. **2506**

The neurohypophysis of 15 chick embryos of 5–21 days' development, and of two adult fowls was studied. In its earliest stage, it is formed of primitive spongioblasts which soon develop processes (7th–12th day) and become supporting cells. Those spongioblasts which leave the ependymal layer are called pituiblasts, and are at first apolar, unipolar or bipolar, and then later multipolar. They are frequently multinucleated even in the adult.

Two types of lobules are described, viz, primary, formed from outpocketings, and secondary, formed from buds growing from the spongioblast layer. These latter become subdivided by connective tissue at a later stage. Each lobule is surrounded by a vascular capsule, with a perivascular space on the inner border, and through this pass the pituicyte processes to become attached to vascular or pial elements.

Pituicytes, astrocytes, and obligodendroglia show numerous morphological and embryological similarities. The presence of neuroblasts and nerve cells in the neurohypophysis was successfully demonstrated.

—JOHN G. CAMPBELL.

RAWSON, R. W., TANNHEIMER, J. F., & PEACOCK, W. (1944). **The Uptake of Radioactive Iodine by the Thyroids of Rats made Goiterous by Potassium Thiocyanate and by Thiouracil.**—*Endocrinology.* **34.** 245–253. **2507**

A number of rats was adapted to a diet containing just enough iodine to maintain a non-goitrous condition. They were then divided into three groups, one being fed as before as control, one fed a supplement of potassium thiocyanate, and the third fed a supplement of thiouracil. After 28 days, the animals were injected with radioactive iodide and all were killed four hours later. Hyperplasia of the thyroid had been produced by both potassium thiocyanate and thiouracil. The action of the two drugs, however, differed in that iodine had been taken up to a more than normal extent in the animals treated with potassium thiocyanate while the uptake of iodine in the thiouracil group was very small.

—RACHEL MARSHALL.

FRANKLIN, A. L., LERNER, S. R., & CHAIKOFF, I. L. (1944). **The Effect of Thiouracil on the Formation of Thyroxine and Diiodotyrosine by the Thyroid Gland of the Rat with Radio-active Iodine as Indicator.**—*Endocrinology.* **34.** 265–268. **2508**

Rats were given a diet containing thiouracil for seven days. At the end of this period, the power of the thyroid gland to convert inorganic iodide into thyroxine and diiodotyrosine was measured immediately and after a further 14 days' feeding without thiouracil. The conversion was followed by observing the uptake by the gland and the conversion to these two substances, of injected inorganic radioactive iodine. Both uptake of iodine and conversion to thyroxine and diiodotyrosine were depressed immediately after thiouracil feeding, but had returned to levels comparable with those of normally fed animals by 14 days after the thiouracil had been discontinued.—RACHEL MARSHALL.

ASTWOOD, E. B., & BISSELL, A. (1944). **Effect of Thiouracil on the Iodine Content of the Thyroid Gland.**—*Endocrinology.* **34.** 282–296. **2509**

Thiouracil was administered to young rats initially by subcutaneous injection of a suspension in agar solution, followed by administration in the drinking water. There was a rapid decrease in the iodine content of the thyroid glands (five days) and increase in the size of the glands (two weeks). Withdrawal of the drug after eight days resulted in a prompt reversal of its action. Injection of thyroxine or hypophysectomy inhibited the action of thiouracil, but when it was withdrawn, though the glands were reduced in size, there was little corresponding reaccumulation of iodine. Sulphadiazine had a similar effect to thiouracil. Injection of thyrotropic hormone induced a marked enlargement of the thyroids, but a relatively small loss of iodine. The hormone delayed the loss of iodine caused by thiouracil administration. The changes in weight and iodine content of thyroid glands appeared to be proportional to the dose of thiouracil.—RACHEL MARSHALL.

DEICHMANN, W. B., & WITHERUP, S. (1944). **Phenol Studies VI. The Acute and Comparative Toxicity of Phenol and *o*-, *m*- and *p*-Cresols for Experimental Animals.**—*J. Pharmacol.* **80.** 233–240. [For parts I–III, see *V. B.* **13.** 369. Parts IV & V not traced]. **2510**

Industrial exposure to phenol and the cresols made it desirable to study their toxic effects upon animals (rats, rabbits, cats). The symptoms observed when

these substances were absorbed, whether given by the mouth or by direct introduction into the stomach, by intravenous or subcutaneous injection, or by cutaneous application were essentially muscular convulsions, coma (in cats), and death in from 15 min. to 2·5 hours. The concentration of a solution of phenol did not appear to be an important factor in determining the degree of poisoning, since when given by the mouth the absolute quantity of phenol introduced was the determining factor and when applied cutaneously the area of skin exposed was more important than the strength of the solution. Phenol and *o*- and *p*-cresol were found to be about equally toxic while *m*-cresol was less so. Soap and water were effective for removing phenol from the skin and have the advantage over alcohol, which is more commonly used for this purpose, in not themselves having any toxic effect when liberally applied.—R. M.

NICHTERLEIN, O. E., & GOLDBY, F. (1944). **An Experimental Study of Optic Connexions in the Sheep.**—*J. Anat.* **78.** 59–67. **2511**

An investigation of the course and connexions of the optic nerves and tracts in the sheep was made by examining degenerative changes as shown by the Marchi technique in nerve and brain sections prepared three weeks after enucleation of the eyeball. It was found that only about one-tenth of optic fibres remained uncrossed at the chiasma. A few aberrant fibres connected from the chiasma to the supra-optic recess. The destination of these later fibres was uncertain but they probably ended in the recess close to the lamina terminalis.

Transneuronal cell degeneration occurred in the three laminae of the lateral geniculate body. These changes indicated that uncrossed fibres were connected with the central lamina, and crossed fibres with the outer and inner laminae of this nucleus.—C. W. O.

WOOD, H. O. (1944). **The Surface Area of the Intestinal Mucosa in the Rat and in the Cat.**—*J. Anat.* **78.** 103–105. **2512**

Histological preparations of the jejunum and ileum of the rat and cat were made following fixation under standard conditions.

A calculation of the surface area of mucous membrane was estimated from measurements of transverse and longitudinal sections, using the formula recommended by WARREN [*V. B.* **10.** 385]. In both animals the mucosal surface of the jejunum per unit length was roughly 1½ times as great as that of the ileum. This is attributed to greater development of the villi in the jejunum. Comparisons of mucosal area per unit serosal area indicated that villous development was three times as great in the cat as in the rat.

There is reason to believe that the intestinal absorption area bears a constant relationship to the total body weight of an animal.—C. W. OTTAWAY.

See also absts. **2524** (blood-brain barrier), **2464**, **2476** (sex hormones), **2474** (artificial insemination), **2465** (thyroid and TB. resistance).

POISONS AND POISONING

FAIRHALL, L. T., MILLER, J. W., & WEAVER, F. L. (1943). **The Effect of Arsenates on the Storage of Lead.**—*Publ. Hlth Rep., Wash.* **58.** 955–959. **2513**

The concentration of lead in the kidneys and bones of a group of rats receiving 1,230 p.p.m. lead carbonate plus 930 p.p.m. sodium arsenate was much less (only 62·3%) than that in a similar group receiving the same basic diet but supplemented with 1,230 p.p.m. lead carbonate only. Also the concentration of arsenic in the kidneys of the group receiving the lead carbonate and sodium arsenate was only about half that found in the kidneys of a group receiving 930 p.p.m. sodium arsenate alone. From these results it appears that arsenates definitely diminish the storage of Pb in bone tissue, and that administration of lead carbonate with sodium arsenate diminishes the concentration of arsenic in the kidneys.

Histological examination of the kidneys, spleen, and liver of animals from all the groups showed that in the spleen the most marked changes occurred in the group receiving sodium arsenate, and the least marked changes in the group receiving the lead carbonate; conversely, the kidneys showed more marked changes with lead carbonate. The tissues from the animals receiving both sodium arsenate and lead carbonate showed changes of an intermediate degree. No significant changes were observed in the liver in any of the groups.—R. ALLCROFT.

BYERS, H. G. (1936). **Selenium Occurrence in Certain Soils in the United States with a discussion of Related Topics. Second Report.**—*Tech. Bull. U.S. Dep. Agric.* No. 530. pp. 78. [For first and third reports, see *V. B.* **6.** 12, and **13.** 337]. **2514**

Data are given on the occurrence of selenium in soils and vegetation in areas surrounding the Black Hills in South Dakota, Nebraska, Montana, and Wyoming and in soils in Colorado, Kansas, and Montana. The results show clearly that there is no relationship between the amount of Se in the surface soil and that absorbed by individual members of the same plant species, *e.g.* a narrowleaf milkvetch growing on a soil containing 1·5 p.p.m. Se contained 1,070 p.p.m. Se, while another narrowleaf milkvetch growing on a soil containing 6 p.p.m. Se had a Se content of only 140 p.p.m. The soluble sulphate content of the soil does not explain these remarkable variations and it appears that factors other than the quantity of Se and variation of S : Se ratios affect the absorption by a given plant species. It is also shown that in these seleniferous areas not all the vegetation is toxic and that the degree of toxicity varies within wide limits for given plants, for soils of similar Se content, and also for different plants on the same soil.

There is evidence that irrigation with underdrainage tends to diminish the Se content of the soil and that if the irrigation water contains sulphates, the absorption of Se by vegetation is reduced.

An investigation of so-called " poisonous " springs showed that potable waters are not likely to contain toxic amounts of Se.—R. ALLCROFT.

MITCHELL, H. H. (1942). **The Fluorine Problem in Livestock Feeding. Fourth Report of the Committee on Animal Nutrition.**—*Repr. nat. Res. Coun., Wash.* No. 113. pp. 10. **2515**

The fluorine hazard in livestock feeding relates mostly to the use of fluorine-containing minerals as supplements to farm rations because of the present shortage of bonemeal; the minerals concerned are rock phosphates, the superphosphates manufactured from them, and phosphatic limestones.

The symptoms of chronic fluorosis in farm animals are discussed and, from a consideration of the factors relating to fluorine toxicity, M. suggests that a concentration of 0·01% F on the dry basis is the approximate borderline between safe and unsafe levels for pigs, sheep, and cattle, while that for chickens is approximately 0·05%. It is pointed out that these levels are

tentative and may need revision as the results of later tests are reported.

After considering the many factors of feeding and farm management that may shift the borderline levels of F, together with the scarcity of precise information concerning the toxic levels for each species, the Committee has recommended that the permissible levels of F in the total dry feed of an animal should be considered tentatively as 0·003% for cattle, sheep, and pigs, and 0·015% for chickens; or for the total grain ration of sheep and cattle 0·006 and 0·004% respectively. These F levels are equivalent to the following percentages of rock phosphate (containing 3·5% F) in the grain mixture, dry basis :– 0·086% for pigs, 0·11% for cattle, 0·17% for sheep, and 0·43% for poultry. These recommended amounts include a margin of safety to allow for variations in individual susceptibility of animals for F in food and water as well as variations in the F content of phosphatic minerals.—R. ALLCROFT.

EMMEL, M. W. (1943). **Livestock Poisoning by Crotalaria Spectabilis.**—*Vet. Med.* **38.** 255–257. **2516**

It is stated that during the past decade, *C. spectabilis* has been used extensively as a cover crop in Southern U.S.A. It grows luxuriantly on poor soils, and has spread to uncultivated land, with the result that it is now growing wild in many districts. The toxic principle, monocrotaline, has been isolated from the leaves, stems, roots, and seeds, the highest concentrations having been found in ripe seeds. The seed and the green, dried, or frosted foliage of the plant are to be regarded as toxic for animals, and cases of poisoning have been observed in horses, mules, cattle, sheep, goats, pigs, and chickens under natural conditions. Most cases have occurred in early autumn when the plant is green and succulent and other forage is dry and unattractive.

In horses and mules, the symptoms resemble those which have been described in *C. sagittalis* poisoning. There is marked peristaltic disturbance and a loss of the sense of direction. Periodic bouts of illness may occur, separated by intervals of apparently normal behaviour, but death usually supervenes 3–4 months from the onset of symptoms. Occasionally the illness lasts up to a year. On P.M. examination, the stomach is usually found greatly distended with food and the body fat is lemon or orange in colour. There is intense mesenteric oedema.

In cattle, both acute and chronic forms of poisoning occur. Acute cases are characterized by salivation, depression, incoordination of gait, and icterus of the visible mucous membranes. Should the animal survive more than 4–5 days, it becomes emaciated, and may exhibit slight bloat, epistaxis, tenesmus, and diarrhoea. At autopsy, petechial and ecchymotic haemorrhages are found throughout the viscera. Chronic cases are seen often 2–6 months after the plant has been consumed. Diarrhoea, bloat, recumbency, and tenesmus, often with slight straining, are the usual symptoms. The lesions include marked oedema of the mesentery and other serous membranes, and of the abomasal and omasal mucosae, pale and "bloodless" intestines, renal congestion, and less frequently, serous pericarditis and ascites.—ALASTAIR N. WORDEN.

ECKELL, O. A. (1942). Acción tóxica del Solanum glaucum Dun (duraznillo blanco). [**Toxicity for Various Animals of** *S. glaucum*].—*An. Fac. Med. vet. Univ. La Plata.* **5.** 9–91. **2517**

The leaves, fruit, and flowers of *S. glaucum* in various stages of development are toxic to g. pigs and rabbits. The leaves of the fruiting plant, macerated in water, cause fatal intoxication of sheep; the ripe fruit, however, has no ill effects on these animals. In cattle, doses up to 1·8 g. of green leaves per kg. body weight give rise to slight disturbance in rumination and to fever. Both the leaves and fruit are toxic to horses, but neither are toxic to swine. The goat is unaffected by the ingestion of green leaves.

As a rule, animals refuse to eat *S. glaucum*, but the g. pig will eat the flowers, and horses, swine, g. pigs and rabbits will consume the fruit when it is mixed with dry rations.

The ingestion of leaves can provoke symptoms of gastro-enteritis with colic, diarrhoea, and inappetence. Dyspnoea and nervous disturbances are occasionally seen, with depression or giddiness. Fever is not constantly present.

The P.M. lesions in acute cases consist of ulcerative or haemorrhagic gastro-intestinal inflammation, together with renal and pulmonary congestion. The lesions of the subacute and chronic types are similar but are less severe.—ISOBEL W. BROCKLEHURST.

SERGENT, ET. (1942). L'envenimement scorpionique provoque-t-il une élévation ou ûn abaissement de la température ? [**The Effect of Poisoning with Scorpion Venom on the Body Temperature**].—*Arch. Inst. Pasteur Algér.* **20.** 209–212. **2518**

Previous experiments on poisoning with scorpion venom have given varying results, increases in temperature being recorded in horses, cats, and dogs. Other species have shown a decrease in temperature, sometimes followed by an increase, or no temperature change at all. The intensity of the symptoms varies with the type of scorpion, but the nature of the symptoms depends on the species of animal concerned.

Medical reports on human beings bitten by scorpions show that, in 50% of cases, the temperature reaches a maximum or minimum during the first two hours after infection, in both severely and slightly affected cases. Injection of scorpion venom invariably produces a sensation of cold, independent of the actual effect on the body temperature. If hypothermia is prolonged, prognosis is very poor, especially in children.

Injection of a lethal dose into white mice was found to cause elevation of temperature (due to shock), followed by a rapid fall below normal before death.

—O. CRUSE.

NIGHBERT, E. M. (1943). **The Effects of the Bites of Poisonous Snakes on Dogs.**—*N. Amer. Vet.* **24.** 363–364. **2519**

A mongrel dog (Alsatian type, weight 54 lb.) was bitten by snakes on four occasions over a period of four years. On the last occasion, the dog's litter mate was also bitten. Recovery from the first bite was complete within a week and was more rapid on succeeding occasions. No treatment of note was given. The snakes which were responsible on the last two occasions were identified as a copperhead mocassin (*Agkistrodon contortrix*) and a cottonmouth water mocassin (*A. piscivorus*). These are two of the most vicious species and very dangerous to man and animals.—E. G. WHITE.

SCUDI, J. V., JELINEK, V. C., & KUNA, S. (1944). **Biochemical Aspects of the Toxicity of Atabrine. I. Acute Effects of Massive Doses in the Rat.**—*J. Pharmacol.* **80.** 144–149. **2520**

SCUDI, J. V., & HAMLIN, M. T. (1944). **Biochemical Aspects of the Toxicity of Atabrine. II. The Influence of the Diet upon the Effects Produced by Repeated Doses of the Drug.**—*Ibid.* 150–159. **2521**

I. The toxic effect of heavy doses of atebrin (450 mg. per kg. body weight) was observed in rats either normally fed or after varying periods of fasting. The drug caused very considerable flow of fluid into

the stomach and intestines with a corresponding haemoconcentration and a loss of bicarbonate and chloride of the blood. The symptoms and mortality were aggravated by fasting previous to administration of the drug. Liver damage was indicated by retention of bromsulphalein and prolongation of the prothrombin time. Increase of the fibrinogen concentration of the plasma indicated inflammation and tissue destruction.

II. Toxic effects of repeated doses of atebrin (4·5 mg. per 100 g. body weight per day) upon the liver of rats appeared to be counteracted when the animals were receiving a high protein, low fat diet but not when they were receiving a high protein, high fat or low protein, low fat diet. In contrast to the results obtained with large single doses of the drug, no indication of liver damage was obtained by the bromsulphalein test or test of the prothrombin time, but fibrinogen concentrations in the plasma paralleled toxic effects upon the liver.

In dogs, daily large doses (25–50 mg. per kg.) of atebrin produced inanition in 3–6 weeks, while smaller doses (5–10 mg. per kg.) were without this effect. Plasma fibrinogen levels were more rapidly increased following daily administration of atebrin if the dogs had been previously depleted of protein by deficient diet; the effect was reversed by restoring protein to the diet.—RACHEL MARSHALL.

See also absts. **2510** (toxicity of phenol and cresols), **2539** (of stilbamidine), **2531** (of sulphadiazine in dogs), **2466** (of mites in fodder).

PHARMACOLOGY, THERAPEUTICS AND DISINFECTION

I. DALE, H. (1943). **Modes of Drug Action. A General Discussion. General Introductory Address.**—*Trans. Faraday Soc.* **39**. 319–322. **2522**

II. GADDUM, J. H. (1943). **Biological Aspects: The Antagonism of Drugs.**—*Ibid.* 323–333. **2523**

III. LOURIE, E. M. (1943). **The Blood-Brain Barrier and Cerebro-Spinal Fluid, in Relation to the Efficacy of Sleeping-Sickness Drugs.**—*Ibid.* 340–348. **2524**

IV. KING, H. (1943). **Chemical Structure of Arsenicals and Drug Resistance of Trypanosomes.**—*Ibid.* 383–389. **2525**

V. QUASTEL, J. H. (1943). **Effects of Narcotics and Benzedrine on Metabolic Processes in the Central Nervous System.**—*Ibid.* 348–359. **2526**

VI. MCILWAIN, H. (1943). **Relations Retween *in vivo* and *in vitro* Actions of Chemotherapeutic Agents.**—*Ibid.* 359–367. **2527**

VII. HURST, H. (1943). **Principles of Insecticidal Action as a Guide to Drug Reactivity—Phase Distribution Relationships.**—*Ibid.* 390–412. **2528**

I. In his introductory address, D. indicates some of the extremely complex problems concerning the actions of drugs and points out the need for all that physical chemistry can contribute to the question, and that future explanations of life processes may be expressed in terms of complicated and labile physico-chemical systems. After giving a brief indication of the subjects to be dealt with by subsequent speakers, D. suggests that care should be taken not to assume too general a significance for the results obtained with a particular biological index, nor to accept too readily any artificially simplified physico-chemical system or model.

II. G. discusses the way in which drugs can suppress or antagonize the action of other drugs. The two most important ways are (1) by neutralization, *i.e.* changing the poison into an inert compound by combining with it or by some other means, and (2) by competition, *i.e.* competing with the poison for combination with certain hypothetical chemical groups which are in some way essential to the life of the tissue. An example of the first method is the neutralization by compounds containing –SH groups of the effects of mercuric chloride or organic arsenical compounds. The second method of antagonism by competition is well illustrated by the way in which sulphanilamide competes with *p*-aminobenzoic acid for combination with some receptor which is essential for the normal multiplication of the bacterium; also the competition between O_2 and CO for combination with haemoglobin is an example which has been studied in great detail.

Mathematical equations are given to express the quantitative relations between each of these kinds of poison and antidote. But as the two types of curve are fairly similar, it would probably not be possible to distinguish between the two types of antagonism by a study of the quantitative relationships; the distinction can be made only from independent evidence that the drugs combine with one another, or that they are likely to compete.

Another type of antagonism between drugs is discussed, *e.g.* indole-acrylate inhibits the growth of certain bacteria apparently by interfering with the formation of tryptophane from indole. A small amount of tryptophane completely antagonizes this inhibition of growth because the source of obstruction (production of tryptophane) is circumvented.

III. Some facts and opinions are presented concerning the nature of the blood-brain barrier and the extent and conditions of its resistance to the passage of trypanocides into the extravascular portions of the brain. The blood-brain barrier is probably mainly localized in the walls of the cerebral capillaries and substances which reach the brain cells from the blood have to pass through the capillary endothelium into the perivascular and pericellular spaces around the cells. It is pointed out that the extent to which actively trypanocidal drugs can pass this barrier is very varied and cannot be deduced from the results of the usual experiments on mice infected with trypanosomes. For example, suramin (Bayer 205) which is very active in destroying trypanosomes in the blood of mice and is effective in the first stages of human trypanosomiasis, cannot pass the blood-brain barrier to any appreciable extent and is therefore powerless to cure when the brain has become infected. Conversely, tryparsamide is only moderately active when tested in mice, but passes the blood-brain barrier readily and is the most effective remedy in the later stages of the human disease.

The need of a suitable technique for determining the ability of trypanocides to penetrate the blood-brain barrier and the difficulties of devising such a test are discussed. As cerebrospinal fluid is the only fluid of the brain which is available for testing in adequate amounts it is therefore usually used for this purpose. By this means it was shown that tryparsamide produced a greater trypanocidal power in the c.s.f. than any of the other compounds tested.

The factors which determine the ability of compounds to penetrate the blood-brain barrier are not well understood. In the case of "polar" substances, molecular size, lipoid solubility, and diffusibility are of minor importance, and the penetration depends on the electrochemical properties of the substances. Negatively charged acid compounds appear to penetrate the

barrier while positively charged basic compounds do not. Colloidal substances do not penetrate no matter what the charge. It is pointed out, however, that numerous other factors are concerned, apart from the electrochemical properties of substances, in the penetration of vital membranes. Thus the rate of disappearance and the rate of excretion must be considered as well as the question of toxicity. Tryparsamide owes its effectiveness to certain peculiar properties. It is relatively non-toxic and in itself has no trypanocidal action but it penetrates into the c.s.f. readily. After penetration, the arsenic atom is reduced from the pentavalent to the trivalent state and the molecule becomes highly trypanocidal and available for action at the desired place.

IV. The nature of the constitutional or physiological changes which take place in drug-resistant trypanosomes is discussed and from an extensive examination of a number of arsenicals, it is concluded that normal trypanosomes can be acted upon by arsenicals in at least three different ways. It is suggested that each of these ways is merely preliminary to the final action which results in the death of the trypanosome and that the final mechanism is a chemical one in which the highly reactive arsenoxide group—the toxophoric group—combines with some essential cell constituent on which the life of the trypanosome depends.

V. Evidence is reviewed in favour of the hypothesis that narcotics intervene in an essential oxidative respiratory chain acting on a substrate which is mainly glucose.

The possible connexion is discussed between amine metabolism in the brain and the development of clinical narcolepsy which is known to be relieved by benzedrine administration. It is suggested that the action of benzedrine *in vivo* is linked with its ability to compete with amines which give rise by oxidation to toxic substances; the lower the concentrations of such amines the lower the quantity of benzedrine which will be required to compete successfully with them.

VI. Chemotherapeutic agents which act upon infections *in vivo* do not always act upon the same bacterium or parasite *in vitro*. Prontosil rubrum and tryparsamide are examples of drugs which are active *in vivo* but inactive *in vitro*, because they require conversion by the host into more active forms. The author discusses the special conditions which must be observed in order that *in vitro* tests shall yield reliable results, and urges that much more attention should be paid to *in vitro* studies of the modes of action of chemotherapeutic agents.

VII. Earlier theories concerning the biological activity of drugs are considered in the light of data available from insecticidal studies. The fact that pure kerosene and ethyl alcohol are separately non-toxic to blowfly larvae but when mixed are extremely toxic, shows the importance of defining the nature and site of drug interaction.

The nature of the surface and framework of insect cuticle is discussed in relation to the mechanism of drug access and to the action of fat solvents and inert dusts. The latter appear to act by removal of lipoid from the epicuticle surface. For the mechanism of drug access, H. suggests a two-dimensional surface diffusion along the interfaces of the lipo-protein mosaic.

The penetration of insect cuticle by fatty acids and alcohols, in terms of physico-chemical principles, is dealt with in detail and the paper concludes with a review of pharmacological action in relation to fundamental biological pattern, showing the many points of resemblance between bounding membranes in such systems as insect cuticle, *Ascaris* integument, erythrocytes, and certain plant tissues.—R. ALLCROFT.

WAKSMAN, S. A. (1944). **Antibiotic Substances, Production by Microörganisms—Nature and Mode of Action.**—*Amer. J. publ. Hlth.* **34.** 358–364. **2529**

The term "antibiotic" has been applied to those substances which are secreted by a variety of microorganisms and which are bactericidal towards pathogenic bacteria. The failure of the majority of pathogens to survive for any length of time in the soil is attributed to the action of these substances. Organisms which have been shown to exhibit antibiotic properties can be grouped as follows:– (1) Non-spore-forming bacteria; (2) spore-forming bacteria; (3) filamentous fungi, and (4) Actinomycetes. The organisms affected by the antibiotic substances are very various and one micro-organism may produce more than one antibiotic substance each of which is active against different types of bacteria. The usefulness of these substances as therapeutic agents may be limited by their toxicity to animals. Such substances as have been chemically identified can be grouped as follows:– (1) polypeptides and proteins; (2) sulphur-containing compounds; (3) pigments; (4) lipoids; (5) quinonoid substances, and (6) organic bases.—RACHEL MARSHALL.

JOHNSON, O. H., GREEN, D. E., & PAULI, R. (1944). **The Antibacterial Action of Derivatives and Analogues of *p*-Aminobenzoic Acid.**—*J. biol. Chem.* **153.** 37–47. **2530**

The antagonistic action of *p*-aminobenzoic acid towards the bacteriostatic action of the sulphonamides is regarded as being dependent upon the reversal of an interference by the sulphonamide in a vital process in which the *p*-aminobenzoic acid normally plays an essential part. Thus substances which are chemically related to *p*-aminobenzoic acid may be expected to offer a similar competition to the sulphonamides, or, if by biological action they may be converted to *p*-aminobenzoic acid, they may themselves reverse the action of the sulphonamides. *p*-Nitrobenzoic acid and *p*-aminobenzamide together with three of the 35 other substances tested were believed to be of the latter type. Twelve of the substances tested showed a similar bacteriostatic effect to the sulphonamides and the effect was reversed by *p*-aminobenzoic acid.—R. MARSHALL.

MAISEL, B., MCSWAIN, B., & GLENN, F. (1943). **Effects of Administration of Sodium Sulfadiazine to Dogs.**—*Arch. Surg., Chicago.* **46.** 326–335. **2531**

The effects of sulphadiazine on the liver, kidney, and reticulo-endothelial system were studied on dogs. The drug was injected subcutaneously in a 20% aqueous solution at a dosage of 0·1 g. of the sodium salt per kg. body weight twice daily. Six dogs were treated for two weeks. Another eight dogs received the drug until they died or were killed; one dog was killed after eight days and one after 21 days, and the others died at 6, 9, 10, 12, 13, and 18 days. In two cases, minimal pneumonia might have been a contributory factor to the cause of death. The deaths of the others were apparently due to sodium sulphadiazine. Full autopsies were made in every case.

The results were as follows:– (1) A normocytic hyperchromic anaemia developed. (2) The urine of all animals was acid to litmus and consistently showed proteinuria, blood, casts, and sulphadiazine crystals. In six animals on the 14th day of treatment the concentrations of sulphadiazine were 203–240 mg. per 100 ml. (3) The maximum blood concentrations were high. Ten animals reached maxima between 40 and 120 mg. per 100 ml. (4) The eight dogs of the second group

showed marked elevation of the urea nitrogen content of the blood. (5) There was moderate elevation of blood pressure in three animals, and slight elevation in two others. (6) Sloughing at the sites of injection occurred in about half the animals. A minimal lobular pneumonia occurred in two dogs. The only other gross pathological changes were streaking in the pyramids of the kidney, crystals in the renal pelvis and calices, and swelling of the renal parenchyma of all animals. The crystals consisted of about 75% free sulphadiazine and the remainder the combined or acetylated form. (7) Microscopic pathological changes occurred in the kidneys, spleen, liver, heart, and bone marrow and in the tissues around the site of injection. The kidney changes were striking and severe, and in the spleen toxic signs were marked. The marrow showed a moderate hyperplasia of all elements. Myocardial petechiae were found in three dogs. Inflammatory reaction of a predominantly mononuclear type occurred in the tissues at the site of injection. The liver tissues appeared normal.

These results are interpreted to show that sodium sulphadiazine injected subcutaneously in dogs produces definite pathological changes in the bone marrow, blood, blood vessels, and kidneys. These tissue changes are essentially due to the drug itself or to some changed form of it. The deaths of four dogs and probably of six were evidently the consequence of damage to the kidneys and resultant uraemia. The relative importance of deposits of the drug and acidity of the urine in predisposing to the severe kidney lesions was not determined.—D. D. OGILVIE.

*UHLMANN, W. (1940). Untersuchung über den therapeutischen Wert von Lachesis-Bengen. [**Therapeutic Action of Lachesis-Bengen**].—*Inaug. Diss., Leipzig.* [Abst. from abst. in *Tierärztl. Rdsch.* **48.** 172]. **2532**

U. claims that he has had very successful results from the therapeutic use of "lachesis", a product of mute-rattlesnake venom, which is available in certain numbered dilutions, and stress is laid upon correct choice of dilution in diseases of differing severity, and upon dosage. Combination of such treatment with allopathic measures is held to be contra-indicated, *e.g.* concomitant iodine therapy is definitely not recommended.

The range of diseases which it is claimed have been treated successfully is wide, and includes conditions in horses, cattle, pigs, and dogs.—A. N. WORDEN.

TSVETKOV, N. E. (1941). Bor'ba s poteryami konskovo sostava vsledstvie zabolevaniya loshadeĭ stolbnyakom. [**The Control of Losses Caused by Tetanus in Horses**]. —*Trud. XV Plen. vet. Sekt. Akad. sel'khoz. Nauk, Moscow, 1939.* [*Diseases of Horses*]. pp. 79–82. **2533**

The present Russian practice is to give horses a single dose of alum-precipitated tetanus toxoid as a prophylactic measure. The following method of treatment is claimed by T. to be of value :– tetanus antitoxin is first injected intravenously ; at the same time drugs such as chloral hydrate or magnesium sulphate etc. are given which reduce the convulsive movements ; several injections of tetanus toxoid are then given during the next few days to enable the circulating antitoxin to overcome the spread of the toxin. T. advocates using urotropine along with the antitoxin.—J. KEPPIE.

PACHECO, G., & DE CAMPOS, G. (1940). Algumas experiencias com fenol sobre o tetano experimental do cão. [**Phenol and its Action on Experimental Tetanus in the Dog**].—*Bol. Soc. brasil. Med. vet.* **10.** 230–233. [Abst. in *Biol. Abstr.* Sect. F. **17.** No. **6.** 32, copied *verbatim.* Signed : SYLVIO TORRES]. **2534**

Phenol in a 3% soln. injd. into the spinal canal alone or together with antiserum did not prove satisfactory as a cure for tetanus. Two dogs out of 3 showed the same results when treated with phenol 24–48 hrs. previous to injn. with tetanus toxin. One dog treated simultaneously by tetanus toxin and phenol, although not mixed, did not show any disturbance.

LECOMTE, A. (1943). Du traitement du tétanos par l'adrénaline. Notes recueillies sur une agnelle. [**Treatment of Tetanus with Adrenalin**].—*Bull. Acad. vét. Fr.* **16.** 233–237. **2535**

L. claims that the intravenous injection of adrenalin is useful in the treatment of tetanus ; this claim is apparently based on observations made on one lamb affected with the disease. L. states that large doses [amounts not specified] of an old, oxidized, and therefore less toxic solution should be given, preferably by means of an apparatus capable of delivery drop by drop, as species and individuals vary in sensitivity to this substance. He goes on to say that the injection should be preceded by a massive dose of antitoxin to neutralize the free toxin. L. assumes that the adrenalin neutralizes the toxin fixed in the nervous system.—J. G. CAMPBELL.

PARKIN, B. S. (1943). **Treatment of Canine Coccidiosis.** —*J. S. Afr. vet. med. Ass.* **14.** 73–76. **2536**

Three species of *Isospora, I. bigemina, I. rivolta,* and *I. felis,* and one species of *Eimeria* are found in the dog. The symptoms of coccidiosis in dogs and the method of diagnosis by flotation of faecal material are described. Details are given of three cases successfully treated. Enemas of sodium sulphanilyl sulphanilate (S.S.S.) with kaolin were used. As a result of experience in these cases, a routine method of treatment was devised ; 10 ml. of a 1% solution of S.S.S. per kg. body weight was given as an enema, repeated in 24 hours. No symptoms of intoxication or vomiting were observed. Definite improvement was noticed within 48 hours and by the fourth day the faeces were usually normal. One case of coccidiosis in a cat was also successfully treated. —E. M. ROBINSON.

BRUMPT, L. C. (1943). La quinacrine ou atébrine dans le traitement des coccidioses des animaux domestiques. [**Quinacrine or Atebrin in the Treatment of Coccidiosis of Domestic Animals**].—*Bull. Acad. vét. Fr.* **16.** 66–77. **2537**

B. has shown that quinacrine is efficacious in the treatment of various types of coccidiosis in domestic animals [see also *V. B.* **14.** 39]. Quick recoveries have been obtained in cases of coccidiosis in cats, rabbits, and cattle. Doses of 0·01 g. per kg. live weight proved of value in cats. The chemical does not completely sterilize the infection in young rabbits, but it reduces the parasites to a number compatible with a state of good health. In bovine coccidiosis the optimum dose *per os* is 1 g. per 100 kg. body weight per day. The duration of treatment must not exceed two days. For intravenous injection a single dose of 1 g. per 100 kg. live weight is administered in 20 ml. boiled water. Further work concerns the minimum dosage given at intervals of some days, repeated consecutive doses separated by a long interval, and the action of quinacrine on the coccidia of fowls and rabbits.—C. HORTON SMITH.

DARRASPEN, E., & FLORIO, R. (1944). Note préliminaire sur l'emploi des diamidines dans le traitement de la piroplasmose du chien. [**Treatment of Canine Piroplasmosis with Diamidines**].—*Bull. Soc. Path. exot.* **37.** 18–20. **2538**

M & B 800, the dichlorohydrate of 4-4'-diamidino diphenoxypentane, is recommended for the treatment of canine piroplasmosis in doses of 4 mg. per kg. live weight, given intramuscularly. It is claimed that

improvement commences within an hour of injection and that only one injection is required. Given intramuscularly, the drug causes no local or general reaction, and relapses do not occur. The number of animals treated by the authors is not stated.—U. F. RICHARDSON.

DEVINE, J. (1944). **Experiments on the Properties and Quantitative Determination of 4 : 4′-Diamidino Stilbene Dihydrochloride. (Stilbamidine).**—*Ann. trop. Med. Parasit.* **38.** 35–45. **2539**

Details are given of the colorimetric determination of stilbamidine by means of glyoxal, a "Spekker" absorptiometer being used. An alternative spectrophotometric method is also described. For estimation of stilbamidine in serum and plasma, preliminary deproteinization with dialysed iron is necessary. Certain properties of stilbamidine were studied, especially those indicating that solutions of the compound are unstable on exposure to light with a subsequent increase in toxicity.—R. ALLCROFT.

MIDGLEY, A. R., MUELLER, W. O., & DUNKLEE, D. E. (1943). **Borax and Boric Acid for Control of Flies in Manure.**—*J. amer. Soc. Agron.* **35.** 779–785. **2540**

The authors advise the use of boric acid, preferably in solution, at the rate of 2½–3 lb. per ton of manure in order to kill fly larvae in manure heaps. Care must be exercised in using manure treated in this way, since the boron tolerance of many crops is not known. For orchards and alfalfa, the rate of application must not exceed 10 tons of treated manure per acre.—J. B. CRAGG.

VANSKAYA, R. A. (1941). Primenenie uglekislovo ammoniya dlya bor'by s Musca domestica L. **[Use of Ammonium Carbonate in Control of *Musca domestica*].**—*Med. Parazitol., Moscow.* **10.** 562–567. **2541**

The method is based on the fact that mature *M. domestica* are stimulated to oviposit by the odour of ammonium carbonate, which at the same time inhibits the development of the eggs. The best results were obtained when a 20% solution was used during warm weather and a 10% solution in cold weather. Other species of flies such as *Coprosarcophaga haemorrhoidalis*, *Fannia canicularis*, and *Muscina stabulans* were similarly stimulated to oviposit.—A. MOLDAWSKY.

NEITZ, W. O. (1943). **The Eradication of the Brown Dog Tick (*Rhipicephalus Sanguineus Ltr.*) from a Dog Kennel.**—*J. S. Afr. vet. med. Ass.* **14.** 90–93. **2542**

As a result of the difficulty encountered in eradicating *R. sanguineus* from dog kennels, in spite of regular treatment of the dogs with various arsenical, carbolic, or derris solutions, a satisfactory method of treating the kennels themselves was sought. By spraying with 6·6% pyagra solution in paraffin, it was found possible to eradicate the ticks. The paraffin was replaced later by a 1 : 4 mixture of paraffin and old motor oil, as with paraffin alone the fumes were overpowering. Eight gallons were used for 6,500 sq. ft. of kennel surface. Three months after treatment, a few ticks were found but after a further treatment the infestation cleared up completely. Spraying every six months is recommended. A list of the diseases transmitted by the brown dog tick is given.—E. M. ROBINSON.

DAVEY, T. H., GORDON, R. M., & UNSWORTH, K. (1944). **The Control of *Notoëdres* Infection in Rats by the use of Soap Impregnated with Tetraethylthiuram Monosulphide.**—*Ann. trop. Med. Parasit.* **38.** 46–57. **2543**

The therapeutic and prophylactic efficacy of tetraethylthiuram monosulphide (Tetmosol) incorporated in soap was investigated on *Notoëdres* infestations of rats. For this purpose a washing technique was devised, in which 0·35 g. soap containing the insecticide was made into a lather with 2 ml. of water, rubbed on the skin of the rat's tail for 40 seconds, and then washed off with six changes of water.

Soap containing 5% Tetmosol and applied twice daily for seven days on the tails of infested rats, sometimes destroyed all the mites while at other times only a partial kill resulted over that period. With a soap containing 20% Tetmosol, the lethal effect upon the mites was increased.

The regular use of 5% Tetmosol twice daily in washing the tails of clean rats constantly in contact with heavily infested companions gave complete protection to the treated area over a period of 25–36 days, the duration of the experiment. Little or no protection followed the use of unmedicated soap. Washing once weekly with soaps containing 5, 10, and 20% Tetmosol reduced the number of mites lodging in the skin, but except in two cases with the 20% soap, infestation was not completely prevented.

No evidence of dermatitis was observed with the continued use of any of these soaps.—W. MOORE.

BRITTON, J. W., MILLER, R. F., & CAMERON, H. S. (1943). **Phenothiazine Salt Mixtures in the Control of Parasitism.**—*Cornell Vet.* **33.** 339–343. **2544**

Two series of lambs were used to test the efficiency of a 1 : 15 phenothiazine + salt mixture for the control of parasitism in sheep. The first series consisted of 198 lambs from a flock of 5,200. The 198 were divided into two equal groups and weighed, and the first group was then kept continually on a 1 : 15 phenothiazine + salt mixture and the second group given plain half-ground salt. The trial began on May 10th and was discontinued on July 7th, at which time the lambs of the phenothiazine-treated group were ready for market whilst those of the control group were showing evidence of parasitism. The average weight gain in the treated group was 37·7 lb. as against 24·6 lb. in the control group.

In the remainder of the flock of 5,200, which were also kept continually on the phenothiazine + salt mixture, the total loss from death was 32. Under the previous routine (copper sulphate + nicotine sulphate drenching) 12–15% of the lambs were unthrifty; such unthriftiness did not occur with the phenothiazine. In a second experiment 3,100 lambs were used, 3,000 being given the 1 : 15 phenothiazine + salt mixture and 100 being given salt only as controls. By July 31st, 1,200 of the lambs on the phenothiazine + salt mixture and 10 of the 100 controls had been marketed as fat lambs; 3 of the controls, but none of the treated lambs, had died, and the rest of the controls were scouring and thin as compared with those of the treated group which were in good condition. A trial was made of the 1 : 15 phenothiazine + salt mixture for the control of parasitism in fattening cattle, but it was found that they did not take the mixture readily. In discussing these results the authors quote other reports of the successful control of parasites by the use of phenothiazine + salt mixtures and point out that if the use of these mixtures continues to produce similar results a great advance will have been made in the anthelmintic treatment of lambs, the use of the mixture obviating the heavy labour of handling and individual dosing of the lambs.
—T. E. GIBSON.

*KOTLÁN, S., & VAJDA, T. (1942). **[Experimental Treatment of Ascariasis in Swine].**—*Közl. Összehas. élet- és kórtan Köréből.* **30.** 329. [Abst. from abst. in *Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **51/49.** 56]. **2545**

Since lack of raw materials had made impossible

the production of the usual ascaricides for swine, the authors investigated alternative substances and found that "gilistol", a combination of tetrachlorethylene with closely related chlorinated hydrocarbons, was suitable. Laboratory and field investigations on 64 isolated pigs showed that 87·5% of the animals were entirely freed from *Ascaris* and that in the remainder the infestation was reduced to insignificant proportions by a single dose of 0·8–1·0 ml. per kg. body weight. Satisfactory results were also obtained in 1,976 pigs on a number of pig farms. The drug is given in gelatin capsule after 24 hours' starvation, although preliminary starvation may be omitted in weak animals or in other special cases. Sodium sulphate at the rate of 1–2 g. per kg. body weight may be given as a purge six hours after administration of the drug. Worms begin to be passed 20–24 hours after administration of the drug, and passage ceases after the second or third day.
—T. E. Gibson.

*Mollard, J. (1941). Du prolapsus pénien chez le cheval. De ses différentes thérapeutiques par rapport au traitement par les suspensoirs. [**Prolapse of the Penis in the Horse. Treatment by Suspensory Methods**].—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 124]. **2546**

A clinical article advocating treatment of "paralysis" of the penis by suspension of the organ. In cases which do not respond the penis must be amputated.
—R. M. Arnold.

D'Ossat, S. de Angelis. (1944). Un nuevo producto para la ganadería "la gonadotrofina suérica". [**Use of Serum Gonadotropin for Livestock**].—*Rev. Med. vet. B. Aires.* **26.** 35–43. **2547**

A general discussion of the use of serum gonadotropin in veterinary medicine.—I. W. Brocklehurst.

Raven, R. W. (1944). **Proflavine Powder in Wounds.**—*Lancet.* **247.** 73–75. [Author's summary copied *verbatim*]. **2548**

In suppurating battle wounds the use of proflavine leads to satisfactory healing within a reasonable time and with a notable lack of scar tissue.

Proflavine has also been used with success in a series of suppurative lesions of soft tissues and in the treatment of burns.

To ascertain its prophylactic value it has been applied to fresh wounds. The danger of overdosage is emphasised.

These observations demonstrate the value of proflavine powder in the types of wounds described.

Vita, J. F. (1944). El rojo escarlata en la regeneración de epitelio. [**Use of Neutral Red to Promote Epithelial Regeneration**].—*Rev. Med. vet. B. Aires.* **26.** 3–5. **2549**

V. advocates the use of neutral red for the treatment of wounds, stating that it hastens the formation of smooth, firm granulation tissue.
—Isobel W. Brocklehurst.

*—. (1942). Desinfektion bei Viehseuchen. [**Germany: Circular on Disinfection in Animal Disease Control**].—*MinistBl. Minist. Inn. A.* pp. 1975–1976. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 568]. **2550**

Caporit, already in use as a disinfectant in certain animal diseases, *e.g.* porcine infectious encephalomyelitis (Teschin disease), has now been found to be useful in the disinfection of manure, etc. Instructions are here set out for its use in the disinfection of faecal matter and the liquid draining from it. Caporit is used in the same way as bleaching powder, but half the quantity suffices; it must be allowed to act for at least two hours.—O. Cruse.

See also absts. **2520, 2521** (atebrin), **2510** (phenols), **2382** (proflavine), **2496** (blood-brain barrier and drug action), **2364** (treatment of tularaemia), **2385** (of sleeping sickness), **2433** (of ear mange in rabbits), **2593** (of "stiff lamb" disease), **2458** (dentistry in horses), **2476** (hormone therapy), **2366** (chlorine disinfection in tularaemia), **2402** (action of drugs on influenza virus), **2597, 2598** (insecticides), **2579-2585** (control of air-borne infection).

HYGIENE AND PUBLIC HEALTH

—. (1944). **Use of the Laboratory.**—*Vet. Med.* **39.** 122–125. **2551**

This is an article outlining the use of the laboratory in food inspection in the U.S.A. Examinations undertaken include the percentage of milk fat, total solids and bacterial count of fluid milk, fat content of butter, fat and moisture content of cheese, and the solubility index and bacterial count of milk powder and dried eggs. Bacteriological examination is carried out on all the milk containers in the dairy where ordinary sanitary inspection has failed to reveal sources of contamination. An example is given, showing how this system works.
—R. M. Loosmore.

—. (1944). **Great Britain. Emergency Powers (Defence). Milk and Dairies, England and Wales. The Heat-Treated Milk (Prescribed Tests) Order, 1944, dated March 23, 1944, made by the Minister of Health under regulation 55G of the Defence (General) Regulations, 1939.**—*Statutory Rules and Orders, 1944.* No. 349. pp. 4. London: H.M. Stat. Off. [8vo] [1d.] **2552**

This order lays down in detail the methods by which the phosphatase test and the methylene-blue test for milk samples must be carried out, together with lists of the apparatus or reagents to be used.—J. C. B.

—. (1944). **Milk—Heat Treatment.**—*Circ. Dep. Hlth Scot.* No. 14/1944. pp. 4. Edinburgh: H.M. Stat. Off. [1d.] **2553**

The supply to certain urban areas in Scotland (to be specified later) is restricted to permitted categories of milk. All milk supplied must be (a) "certified" or "T.T.", or (b) "standard", provided that all the milk sold by any one dairyman is derived from the same herd, or (c) "heat-treated", "pasteurised" or "sterilised". Producer-retailers may sell "standard" milk from more than one herd, without submitting it to heat treatment, provided that the milk is sold in separate containers which are clearly marked. Milk may be heat treated only in plants the owners of which hold an authorization from the Ministry of Food. The rest of the circular deals with the powers and duties of the Scottish local authorities in the enforcement of the regulation and with some further requirements relating to the location of the sale of milk.—J. C. Buxton.

Bremer, H. E. (1944). **The Value of the Milk Serum Agglutination Test in Safeguarding Raw Milk Supplies.**—*J. Milk Technol.* **7.** 26–30. **2554**

The results of tests for brucellosis in Vermont are described. 690 herd samples were tested and 12% showed infection. Individual samples were then tested from 1,853 cows in 92 herds; 15% reacted and 6% gave "suspicious" reactions. Forty of the 92 herds were then blood tested. Of 1,181 cows in these 40 herds, 22% reacted and 9% gave "suspicious" reactions.

A comparison of the two tests is described. In 472 cows examined 99·1% of the blood tests confirmed or were of higher titre than those obtained with the milk test.

It was found that many cows negative to the milk-serum test were " suspicious " or confirmed reactors to the blood-serum test, indicating that many reacting cows would be overlooked if the milk-serum test were alone used as a basis for determination. A slight milk-serum reaction is indicative of a stronger reaction on blood testing.

The milk-serum test is now being used as a screen test and, following a positive or suspicious reaction, the herd is blood tested, reactors removed, or the milk pasteurized.—H. E. Bywater.

Mello, A. (1940). Leite e tuberculose infantil. **[Milk and TB. of Childhood].**—*Rev. indústr. Anim.* **3.** No. 4. 3–6. **2555**

A general article on the incidence of bovine type TB. in children, and on the effect of pasteurization in reducing the morbidity rate of this disease, and of typhoid, dysentery, diphtheria, and brucellosis.

—Isobel W. Brocklehurst.

Mello, A. (1942). Pesquisa do M. tuberculosis no leite pasteurizado da Capital. **[Examination of Pasteurized Milk in São Paulo for the Presence of Tubercle Bacilli].**—*Bol. Industr. anim., S. Paulo.* **5.** No. 4. 7–14. [English summary]. **2556**

The tubercle bacillus was found in 5·7% of samples of pasteurized milk from the Municipal Dairy of São Paulo. Although the phosphatase test was not carried out, it was proved that the milk had been inadequately heat-treated. After the defects in the pasteurizing plant had been rectified, no tubercle or coliform bacilli were found in the treated milk.—I. W. Brocklehurst.

Sutherland, P. L., & Berger, F. M. (1944). **A Milk-Borne Outbreak of Gastro-Enteritis Due to Salmonella Dublin.**—*Brit. med. J.* April 8th. 488–490. **2557**

An outbreak of gastro-enteritis in man was caused by milk infected with *S. dublin.* Two hundred households were supplied with milk from one farm and 162 persons in 79 of these were affected. Bacteriological examination of the milk showed it to be very heavily infected with *S. dublin,* and the organism was isolated from the faeces or urine of eight of the ten affected persons associated with the farm.

An apparently healthy cow was found to be a carrier. The milk was not infected, but the animal was found to be infected by agglutination tests of its milk ; the organisms were numerous in its faeces. It was assumed that the bulk supply was contaminated from the faeces of the cow due to unhygienic management.

—J. O. L. King.

Johns, C. K., & Gibson, C. A. (1944). **The Influence of ' Abnormal ' Milk upon the Yield and Quality of Cheddar Cheese.**—*J. Dairy Res.* **13.** 287–294. **2558**

Experiments were conducted under factory conditions to determine whether milk classed as abnormal on account of its high catalase and leucocyte contents influenced the yield and quality of cheddar cheese. Mastitis was considered to be the commonest cause of such abnormalities, and *Streptococcus agalactiae* was isolated from a number of samples. The cheese failed to maintain its initial flavour, and had a somewhat high moisture content, although this was not high enough to alter either body or texture. The yield was not affected. It was, however, found that the yield was influenced by the solids-not-fat and casein contents, and it is pointed out that subclinical mastitis accounted for a very high proportion of such abnormal milk.

—J. O. L. King.

Koen, J. S. (1943). **Meat Inspection.**—*N. Amer. Vet.* **24.** 529–540. **2559**

In order to make known to the general public the benefits derived from meat inspection, several cities embarked on an advertising campaign which has resulted in a wider appreciation of the work done by meat inspectors ; this has brought about an increased consumption of inspected meat.

Drastic improvements, to obtain more hygienic methods in the dressing and preservation of meat, have been carried out in many large cities with surprisingly active co-operation from the owners of abattoirs.

It was decided that, in St. Louis, an inspection of plant was necessary before permits could be issued for their use. The objects of such inspection are given. A detailed description is given of the manner in which one plant was altered and adapted, embodying an improvement in the lighting and general hygiene. K. considers that meat inspection in the U.S.A. is the best in the world and states that 70% of all meat in the U.S.A. is inspected.

A list is given of conditions which should necessitate condemnation of carcasses.

Ante-mortem inspection is stressed as being an integral part of meat inspection since many diseased conditions are only to be diagnosed prior to slaughter.

Tuberculin reactors and " in-contacts " of acute septicaemic conditions and all animals with high temperatures should be held for observation.

Trichinosis forms a danger not fully appreciated, being of wider occurrence than is usually suspected in the U.S.A. Thorough cooking destroys the parasites. Storage at 5°F. for 20 days renders meat safe, as does also dry salting. Sausages which are usually eaten raw present a most dangerous means of infection, as does undercooked meat. Prevention by proper cooking is the only remedy.

Animals slaughtered in advanced pregnancy or just after parturition should be either condemned or their flesh sterilized.

Scanty observations are available concerning lesions of the internal organs. K. states that research into the diseases of the liver is being pursued, owing to the relatively heavy condemnation of this valuable source of food.—H. E. Bywater.

Getting, V. A., Wheeler, S. M., & Foley, G. E. (1943). **A Food-Borne Streptococcus Outbreak.**—*Amer. J. publ. Hlth.* **33.** 1217–1223. **2560**

An unusual outbreak is described of streptococcal toxaemia due to eating ham cooked and minced by a woman in the early stages of scarlet fever.

The ham was brought to the boil and simmered for some hours, and then left in the water in which it was cooked until the following day when it was boned and minced. It was then left for 24 hours at room temperature before being made into sandwiches.

It is concluded that while the ham was soaking in the warm water an enterotoxic substance was produced and the production of this substance continued after the ham was minced. Of the 140 persons who consumed the ham, four ate it immediately after it had been cooked and none of these became ill ; of the 116 who ate it about 36 hours later, 82 were affected. Fourteen others ate the ham at a later period and of these 13 became ill, while all of six other persons who consumed the ham still later became ill.

Lancefield group A, Griffiths type 2 haemolytic streptococci were isolated from the minced ham, from the throat of the woman who prepared the ham, and from nine other cases.—H. E. Bywater.

Gisske, W. (1943). Über Wesen und Ursache des vermehrten Auftretens der Verderbniss bei hausge-

machten Fleisch- und Wurstkonserven. **[Deterioration of Home-Preserved Meat and Sausages].**—*Z. Fleisch- u. Milchhyg.* **54.** 14–19. **2561**

The causes of the spoilage of home-preserved meat and sausages are discussed. Special faults to be avoided are the use of materials of inferior quality or stale materials, the presence of air bubbles, and insufficient cooking, so that sterilization is not achieved.

A period of three hours (minimum) at 100°C. is required for preserving jars and containers of the ordinary household size. In the case of very fat mixtures, a sterilization period of at least 3½–4 hours is required. Thorough cooling immediately after the heating is essential, and storage must be at a temperature below 15°C.—O. Cruse.

Michalka, J. (1943). Über einige durch Bakterienwachstum bedingte biochemische Veränderungen des Fleisches. **[Biochemical Changes in Meat Due to Bacterial Growth].**—*Z. Fleisch- u. Milchhyg.* **54.** 11–14. **2562**

Bacteriological examination of meat is necessary as a means of detection of infection. Although biochemical tests for particular purposes are of great value, they cannot replace bacteriological examination. —O. Cruse.

See also absts. **2588** (public health laboratory), **2563** (milk inspection), **2367** (paratyphoid fever).

TECHNIQUE AND APPARATUS

Hasson, R. (1943). **A New Method for Field Use in Recognizing Bacteria Numbers and Kinds.**—*Army vet. Bull., Wash.* **37.** 80–86. **2563**

By this sampling method, used by milk and dairy inspectors in California, a reasonably accurate reading of bacterial flora in milk can be rapidly obtained. The equipment used is described and consists of suitably sized bottles containing solid, sloped medium. The fluid to be tested is flooded on to the slope and poured off immediately, leaving a thin film which is fixed on the surface of the medium by adsorption. The bottles can be examined for numbers and colonies and types of organism after overnight incubation in an inverted position. The accuracy of the method is compared with the conventional plate count and found to be favourable.—J. M. Peters.

Polding, J. B. (1943). **A Simple Method of Preserving Bacteria Dried** *in vacuo*.—*J. Path. Bact.* **55.** 502–503. **2564**

Glass beads coated with bacterial growth are dried in a vacuum desiccator over calcium chloride and transferred into the body of an ordinary Bayer's venule, so filled that it contains from bottom upwards a layer of calcium chloride, and two cottonwool plugs isolating the glass beads. It is closed by the rubber stopper and glass valve, the needle of which has been cut off just above the point where it is fused into the glass. The venule is then evacuated, the valve allowed to close, and a complete seal ensured by dipping the needle in melted wax.

The main advantages claimed for this method are its simplicity and the fact that multiple subcultures are possible from a single venule.—M. L. Levi.

Brauss, F. W. (1943). Hefeextrakt zur Herstellung von Bakteriennährböden. **[Yeast Extract in the Production of Bacterial Culture Media].**—*Zbl. Bakt. I.* (*Orig.*). **150.** 220–224. **2565**

It was found that yeast extract could replace the meat extract in solid and liquid culture media without detriment to their nutrient properties, but that peptone could not then be omitted although the percentage could be reduced by 50%. The test organisms used belonged to the colon-typhoid group, and one strain of streptococcus and one of staphylococcus were also employed. Yeast-extract peptone media in certain cases gave a more luxuriant growth than meat-extract peptone media. A disadvantage of yeast extract was that when incorporated in media such as Endo's, the lactose was fermented by non-lactose-fermenting salmonella. —D. L. Robarts.

Friewer, F., & Shaughnessy, H. J. (1944). **Lead Semisolid Agar, a Medium for Use in the Identification of the Enteric Group of Bacteria.**—*Amer. J. clin. Path.* Tech. Sect. **8.** 1–5. Suppl. to *Amer. J. clin. Path.* **14.** No. 1. (1944). **2566**

A lead acetate semi-solid agar medium has been particularly useful where there is a large number of specimens to be examined. Lactose fermentation, hydrogen sulphide production, and motility can be read in one tube.—D. W. Menzies.

Bartel, H. (1942). Nachtrag zum Verfahren zur Rückgewinnung des Agars aus gebrauchten Nährböden. **[Supplementary Note on Recovery of Agar from Used Culture Media].**—*Tierärztl. Rdsch.* **48.** 319. **2567**

The used culture medium is soaked for 2–3 days in 0·7–1% chloramine solution, being stirred occasionally; this bleaches the agar of any incorporated dye. The medium is then washed for 2–3 days in a constant stream of water and the agar is then squeezed. Excess water is reduced by drying at room temperature in sacs of muslin four layers thick, the sacs being squeezed by weighting them down prior to hanging them up.

Examples of calculations of the degree of drying and directions for the preparation of certain media are given.—D. L. Robarts.

Loving, W. L. (1943). **The Cultivation in vitro of *B. leprae* with Thiamin (Vitamin B_1) Culture Medium.**—*Amer. J. trop. Med.* **23.** 593–596. **2568**

Rabbits were inoculated intraperitoneally and subcutaneously with human leprous tissue emulsion. At the same time, the suspension was sown on to a special medium containing thiamine, on which a pure culture of acid-fast bacilli was obtained. The rabbits were killed 1½–5 months after inoculation. A local lesion was produced and also discrete lesions in the liver and spleen; all lesions showed many acid-fast bacilli. Cultures on the enriched medium were made from the organs and, after 2½ months' incubation, chromogenic growth appeared; smear preparations showed a pure culture of an acid-fast bacillus. Later subplants grew in 3–5 days.—John Francis.

Koons, M. E. (1944). **The Laboratory Diagnosis of Tuberculosis. A Comparative Study of Animal Inoculation and Microscopic Examination.**—*J. Lab. clin. Med.* **29.** 75–80. **2569**

Of 590 specimens ranging from sputa to gastric washings, 21·8% were positive by g. pig inoculation as against 6·1% by microscopic examination. Some cases, K. suggests, will be missed by either method used alone. —M. L. Levi.

Graham, C. F. (1943). **Fluorescence Microscopy of Mycobacterium Tuberculosis.**—*Amer. Rev. Tuberc.* **48.** 421–434. [Spanish summary]. **2570**

A technical study of the basic factors which are important in obtaining successful results with fluorescence microscopy of *Mycobact. tuberculosis*. G. emphasizes that there is a danger that the method may fall into disrepute because of too great empiricism. The following topics are discussed in detail, *viz*, sources of illumination, the optical system, the exciting waveband, filters and stains etc. Auramine-O is recommended as a suitable acid-fast dye, but it is poorly fluorescent and more suitable dyes are tentatively mentioned. The combined use of dark-ground illumination with f-microscopy gives excellent results; the use of Gabbett's counterstain, as described, gives equally good dark fields with direct illumination and dispenses with the necessity for setting up a dark-field microscope. The staining technique used is simpler than the Ziehl-Neelsen method and the identification of acid-fast bacilli is not difficult. It is admitted that special optical equipment is necessary which is not, however, beyond the reach of the average well provided laboratory.
—J. KEPPIE.

FELDMAN, W. H. (1943). **A Scheme for Numerical Recording of Tuberculous Changes in Experimentally Infected Guinea Pigs.**—*Amer. Rev. Tuberc.* **48.** 248–255. [Spanish summary]. **2571**

A scheme, designed particularly for use in studies of the *in vivo* effects of chemotherapeutic agents, is suggested whereby the tuberculous changes in experimentally infected g. pigs may be numerically expressed. Assessment of the degree of TB. exhibited by an infected animal is based on microscopic examination in relation to the type, size, number, and progressive or non-progressive nature of the lesions present; tuberculous disease in different tissues (*e.g.* spleen, lung, liver, site of inoculation, and contiguous lymph nodes) is assigned varying numerical values. The whole assessment is made in relation to an arbitrary standard of 100 units, this standard being defined as the maximum theoretical amount of TB. possible in any one animal.
—J. LOCHIEL MCGIRR.

BECKMAN, H., & SMITH, J. (1943). **A New Method of Counting Plasmodia in Avian Malaria Infections.**—*J. Lab. clin. Med.* **28.** 1735–1740. **2572**

Instead of counting arbitrary standard numbers of either plasmodia or erythrocytes, the authors examine erythrocytes for an arbitrary standard time of 3 min., recording the number of plasmodia encountered in this time [see also BECKMAN—*V. B.* **11.** 506].

There is uniformity in the number of erythrocytes examined, for the number of fields seen within 3 min. varies according to the number of erythrocytes per field. There is a reasonable certainty that the smear is negative if, after examination of erythrocytes for 3 min., no plasmodia are encountered. The authors claim that their method requires less time for its execution than the "standard" method, but makes it possible to examine more than twice the number of erythrocytes, and thus permits earlier detection of potency than does the more usual method.—C. HORTON SMITH.

RATCLIFFE, H. L. (1944). **A Method for Preparing Permanent Slides of the Ova of Parasitic Worms.**—*Science.* **99.** 394. **2573**

A gum acacia + chloral hydrate medium has been used for the preparation of microscope slides of the ova of parasitic worms and has been found to be superior to the aqueous media commonly employed for this purpose. The faecal suspension containing the eggs is passed through gradually increasing concentrations of the medium, the process taking several months, until finally the eggs are suspended in the pure medium. Mounts are then made from this suspension. For full details of the technique the original article should be consulted. In addition to nematode eggs, small nematodes, mites, ticks, lice, and the larvae and pupae of flies have been mounted by this method.—T. E. G.

MCFARLANE, D. (1944). **Picro-Mallory. An Easily Controlled Regressive Trichromic Staining Method.**—*Stain Tech.* **19.** 29–37. **2574**

Three modifications of Mallory's connective tissue stain evolved from a previously reported method (LENDRUM & MCFARLANE, 1940) are described.

The first modification, critical and applicable after all commonly used fixatives, has proved very useful in spleen histology, in demonstrating cytological changes in the pituitary, and in the study of nephritis. Nuclei are stained in iron haematoxylin and differentiated in picric acid solution containing orange G. Running water removes the yellow colour from all tissues except those which finally remain yellow (usually erythrocytes). The section is then stained in acid fuchsin mixture and differentiated to the required depth of contrast, stained in aniline blue, and differentiated again.

Some of the disadvantages of Mallory's stain technique are overcome by this method. These disadvantages are:— uncertain results in the hands of some workers; suitability only after chromate-containing fixatives or certain mordants, and degradation to purple by the aniline blue stain of some elements already stained red. To correct this last fault a blue differentiator has been evolved, containing phosphotungstic acid, picric acid, alcohol, and water in different proportions from those used for the red differentiator. It was found that when sections were washed in tap-water after differentiating in picric acid and orange G, the yellow colour left the connective tissue first, and the other tissues in the following order:— cytoplasm, certain granules, fibrin, and lastly, erythrocytes.

The action of picric acid in Van Gieson's technique was examined. When the proportion of picric acid to acid fuchsin is 1 : 4 or 1 : 2, all elements except the erythrocytes are deep red. As the concentration of picric acid is increased, the cytoplasmic elements begin to take the yellow stain until, when the Van Gieson formula (picric acid 10, acid fuchsin 1) is reached, only the connective tissue is stained red.

In the second method described, nuclei are stained in haemalum, the preparations are immersed in picric acid and acid fuchsin, differentiated, stained in aniline blue, and again differentiated.

In the third, a one-solution method, after the nuclei are stained, the preparations are immersed in the "Picro Mallory" solution and differentiated. This method is least critical and best results are obtained after fixatives containing chromate. The second and third methods are useful when large batches of slides are to be stained at a time.—T. M. DOCKER.

*PAKESCH, E. (1943). Über ein einfaches Verfahren zur Herstellung sogenannter Schnellschnitte. **[Simple Method of Preparing Frozen Sections].**—*Zbl. Path.* **81.** 206. [Abst. from abst. in *Z. Fleisch- u. Milchhyg.* **54.** 27]. **2575**

The piece of tissue is boiled in 10% formol over a large flame, washed for a short time in water, and frozen sections are prepared. After staining with 1% aqueous thionin solution, these can be examined directly without the preparation of permanent mounts.
—H. SCOTT MCTAGGART.

LILLIE, R. D. (1944). **Studies on the Decalcification of Bone.**—*Amer. J. Path.* **20.** 291–296. **2576**

The use of Romanowsky stains for bone marrow after decalcification is often unsatisfactory. For some

years, L. has used 5% formic acid (90%) in water with very satisfactory results. The present study includes an investigation of a variety of decalcifying agents, with and without buffer mixtures. Aqueous formic acid proved as satisfactory as any. For simultaneous fixation and decalcification, the use of 5% formic acid in place of acetic acid can be recommended with Zenker's and Bouin's fixatives.

Acetic acid is unsatisfactory for decalcification. Nitric and sulphurous acids act rapidly but give unsatisfactory Romanowsky staining. Solutions of formic, acetic, and salicylic acids in 80% alcohol do not decalcify. The use of vacuum in decalcification is of no value in hastening the process. Preliminary defatting saves very little time in decalcification.—E. G. WHITE.

*TASSEL, L. (1943). Technique des injections intraveineuses chez le chien. **[Intravenous Injections in Dogs].**—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 121]. **2577**

T. reviews the technique for intravenous injections in the dog. He states that the vein of choice is the jugular, followed by the cephalic vein (of the forearm), and last the internal saphena.—R. M. ARNOLD.

TAYLOR, R. M., & CHIALVO, R. J. (1943). Técnica simplificada para la inoculación en el saco amniótico de embriones de pollo. **[Simplified Technique for Inoculation into the Amniotic Sac of Chick Embryos].**—*Rev. Inst. bact., B. Aires.* **11.** 446–448. **2578**

During the process of candling the egg, the border of the air-sac is marked with a pencil, on the shell. The shell over the air-sac is then removed by means of a dental carborundum disc, the underlying shell membrane being separated with sterile scissors.

A pair of fine curved forceps is introduced, closed, into the egg, past the shell and allantoic membranes, care being taken to avoid the yolk-sac and blood vessels. These can be seen if a drop or two of alcohol is placed on the shell membrane to render it transparent. The forceps are now opened, and the amniotic sac is grasped and brought out. After the inoculation, it is released and returns to its former position.

The circular opening is then covered with a hemispherical glass, of internal diameter 32 mm. The junction is sealed by dipping the edge of the cover in paraffin wax before placing it in position.

—ISOBEL W. BROCKLEHURST.

I. GARROD, L. P. (1944). **Some Observations on Hospital Dust with Special Reference to Light as a Hygienic Safeguard.**—*Brit. med. J.* Feb. 19th. 245–247. **2579**

II. WRIGHT, J., CRUICKSHANK, R., & GUNN, W. (1944). **The Control of Dust-Borne Streptococcal Infection in Measles Wards.**—*Ibid.* May 6th. 611–614. **2580**

III. HARWOOD, F. C., POWNEY, J., & EDWARDS, C. W. (1944). **A New Technique for the Application of Dust-Laying Oils to Hospital Bed-Clothes.**—*Ibid.* 615–616. **2581**

IV. ANDERSON, P. H. R., BUCHANAN, J. A., & MACPARTLAND, J. J. (1944). **Oiled Floors to Control Respiratory Infection. An Army Experiment.**—*Ibid.* 616–617. **2582**

V. —. (1944). **The Control of Cross Infection in Hospitals. (Memorandum prepared for the Committee on Preventive Medicine of the Medical Research Council by the Sub-Committee on Cross Infection in Hospital Wards).**—*War Memo. med. Res. Coun. Lond.* No. 11. pp. 34. London: H.M. Stat. Off. [6d.] **2583**

VI. PULVERTAFT, R. J. V. (1944). **The Use of Antiseptic Sprays for Air Sterilization. A Summary of a Report to the Medical Research Council.**—*J. Hyg., Camb.* **43.** 352–356. **2584**

VII. MILLARD, C. K. (1944). **Aerial Convection from Smallpox Hospitals.**—*Brit. med. J.* May 6th. 628–629. **2585**

[See also abst. 2601].

I. Samples of dust from wards were suspended in sterile water and sown on to blood-agar plates containing 1 : 500,000 gentian violet. The growth of almost all indifferent bacteria in dust was inhibited, but *Streptococcus pyogenes* grew freely. These organisms were particularly frequent in dust near patients' beds, but were also isolated from window ledges, etc. It was particularly noticeable, however, that in positions exposed to normal diffuse daylight, even though glass was interposed, the streptococci were much less numerous than elsewhere. It is suggested that good natural light is of considerable importance in preventing atmospheric spread.

Haemolytic streptococci in dust survived for at least six months if protected from light, the sterilizing action of which was also tested on samples of dried infected pus [see also EDWARD—*V. B.* **14.** 225].

II. The spread of haemolytic streptococci was studied in two measles wards. In one, no steps were taken to prevent dust-borne infection: in the other, the floors were treated with spindle oil combined later with treatment of the bed-clothes, garments etc., with technical white oil. The bacterial content of the air, dust etc., was determined by regular sampling with a slit sampler using gentian-violet, blood-agar plates. The predominant organism was a type 6 streptococcus prevalent in both wards at the commencement of the experiments. Prevention of cross-infection was not achieved by oiling floors alone, but the full anti-dust measures were most effective since the reduction in type 6 streptococci was over 90%.

III. The usual methods of treating fabrics with dust-laying oils, *viz*, impregnation with oil in an organic solvent or concentrated oil-in-water emulsions entail a recovery process for the mineral oil, an uneconomic proposition for large-scale application. It has now been found that minimal quantities of oil can be deposited by the use of a cation-active substance such as cetyl pyridinium bromide which establishes high positive charges.

For large-scale laundry work the washed articles can be treated with aqueous solutions of technical white oil, the positive-charged emulsion containing the cetyl compounds as the stabilizer and the other containing an anion-active agent based on the sodium salts of sulphated secondary alcohols. The mixture is dispersed by a fine jet and the deposition is equivalent to 6% of oil.

IV. An experiment involving two army units is described. One unit was housed in a barrack room in which the floor was periodically treated with spindle oil, while the other, in which the floor was unoiled, served as a control unit. Records were kept of the incidence of upper respiratory catarrh and of generalized influenza-like infections.

Over a period of three winter months (January-March), there was a weekly average of seven cases in the experimental group as compared with 38 in the controls: moreover, an outbreak of almost epidemic proportions occurred in February which was confined to the control unit. It is concluded that the reduction of floor dust significantly lowered the rate of respiratory infections.

V. The recommendations of this Committee are mainly concerned with prevention of cross-infection in hospitals, in particular amongst young children. From

a comparative point of view, it is noteworthy that the most prevalent type of cross-infection is regarded as of respiratory origin. Haemolytic streptococci and pneumococci are the most frequent causal organisms and are shed by nose and throat secretion, sinus discharges, and sputum. They may be transmitted through the air in the form of droplet nuclei which remain suspended in the air or may contaminate dust.

Precautions to be taken include adequate ventilation, proper bed spacing, use of face masks, the treatment of floors with spindle oil and the impregnation of blankets with technical white oil. There is a useful appendix on the efficacy of disinfectants with a list of suitable preparations for various purposes.

VI. Experiments were undertaken on the lethal properties of various aerosol mists introduced into a closed room with nebulized bacteria, the test organism in most instances being a strain of β-haemolytic streptococcus, type C.

The antiseptics tested were eugenol carbinol and hexyl resorcinol both in propylene glycol, sodium hypochlorite, and catechol. Eugenol carbinol was very effective in concentrations as low as 0·25%, but it deteriorated and was slightly irritant. Hexyl resorcinol in a similar concentration was as effective as catechol, but was slower in action : it had the advantage that the mist remained effective for 30 min., whereas eugenol carbinol soon became impotent. Sodium hypochlorite was non-toxic and reasonably effective in concentrations of 1% and over. Catechol was completely non-irritant but was slightly toxic. It was most effective in a solution of 2–5% in propylene glycol.

The effectiveness of these agents against sprayed bacteria did not obtain when the organisms were dried or were mixed with dust. The resistance of dust-borne organisms was confirmed by tests in hospital wards during bed-making. Antiseptic mists in concentrations known to be effective against sprayed bacilli failed to reduce the microflora in the air.

Sodium hypochlorite in 1% solution was active against streptococci emitted by infected ferrets. The results, however, were variable, probably on account of the emission of large particles when the animals sneezed. The activity of mists against this type of infection was apparently enhanced by the cumulative effect of repeated spraying, since " old ", inactive eugenol carbinol mists seemed to increase the efficacy of a newly introduced mist. From the practical point of view it may be found that once an antiseptic mist has been created, it may be necessary to add new mists only in very small amounts to obtain a satisfactory lethal effect.

The addition of glycerol which, theoretically, should increase the killing powers of antiseptic mists by preventing drying, failed to accelerate the lethal effect : moreover, no improvement followed the use of a wide variety of surface-tension-reducing agents.

VII. M. discusses the theory of the spread of smallpox infection by " aerial convection ", a method which was widely supported when smallpox was epidemic in this country although in recent years this theory appears to have fallen into disrepute. Several outbreaks occurring in the region of isolation hospitals during the period 1876–1904 are analysed. As the available data strongly supports a spread to the surrounding districts by air-borne virus, it is suggested that certain hospitals should be allowed to isolate smallpox cases in a general isolation hospital in order to obtain fuller information on this method of spread.

—R. E. Glover.

See also absts. **2344** (mastitis diagnosis), **2376** (cultivation of *Cl. oedematiens*), **2419** (production of tetanus toxin), **2388** (tissue culture of plasmodia), **2441, 2442** (of neoplasms), **2503** (pregnancy diagnosis), **2414** (epidemiological study of wild animals).

MISCELLANEOUS

Plunkett, J. J. (1944.) **A Survey of the Work of The Royal Army Veterinary Corps with the British Expeditionary Force in France from December, 1939, to June, 1940.**—*J. R. Army vet. Cps.* **15.** 28–32. **2586**

The first B.E.F. veterinary hospital was set up near Marseilles on December 17th, 1939. This dealt especially with the movement of cavalry into the Middle-East *via* France. At the same time a detachment was sent to Dunkirk to deal with horses landing from England. Considerable difficulties of accommodation, equipment etc. were encountered and were increased by unusually severe weather. Nevertheless several thousands of animals were safely transported. Owing chiefly to the weather, the sickness rate was relatively high. Pneumonia and exhaustion were the commonest conditions. Injuries were not common.

Several mule units were set up in France and veterinary officers were attached to them. These units were engaged in carrying supplies and R.E. stores when the German offensive began in 1940. The mule units moved to Dunkirk where the personnel were evacuated, although the animals had to be abandoned. One horse company was captured in another part of France, while another was evacuated at Boulogne.—D. D. Ogilvie.

Peatt, E. S. W. (1944). **Activities of the R.A.V.C. in the Middle East.**—*J. R. Army vet. Cps.* **15.** 54–56. **2587**

The activities of the Royal Army Veterinary Corps from 1941, when the Cavalry Division was mechanized, are related. Duties since assumed by the R.A.V.C. included, in 1941, those of the British Remount Service and also the purchase of cattle and sheep and their maintenance at livestock depots until required for slaughter.

In 1942, meat inspection was taken over, all meat for the army being inspected by R.A.V.C. personnel in Syria and Palestine. The War Dogs Scheme was also started, to purchase dogs to supply the demands of the Corps of Military Police.

Waste army food is utilized by the pig farms established by the R.A.V.C. in 1943. These farms each accommodate 500 pigs, including 50 breeding sows, and rabbits are also bred to supply an alternative meat as a substitute for chicken in the military hospitals.

The employment of pack animals on an ever increasing scale in Italy has led to demands for veterinary and remount units, veterinary hospitals and remount depots.—J. A. Griffiths.

Wadsworth, A. B. (1941). **The Public Health Laboratory.**—*Nelson Loose-Leaf Medicine.* **7.** 547–567. **2588**

The public health laboratory is an essential feature of public health administration in the U.S.A.

An account is given of the functions of an efficient public health laboratory service including its aims, administration, directorship, cost, and the necessity for expert research staff.

Short reviews of laboratory service as seen in the U.S.A., South America, and Europe are given. The establishment of standards which have become international in scope is discussed as is also the need for consultation between practitioners and the public health

laboratory personnel. In rural areas, the contact of public health officials and practitioners with the public health laboratory is often insufficient, because the laboratory service is too centralized.

The necessity for adequate publicity is referred to and it is pointed out that reports of research work and other information relating to public health laboratory services in a district should be made available to physicians and others. The most effective publicity is the character and quality of service.—H. E. BYWATER.

BARRETT, C. D. (1944). **The Veterinarian and the Army Sentry Dog.**—*N. Amer. Vet.* **25.** 226–232. **2589**

The sentry dogs of the American armed forces comprise the K-9 section. Their recruitment, training, and eventual transfer to army units are described. The minimum weight is 50 lb. and a list is given of breeds (and their crossbreeds) found suitable.—C. V. W.

DANBY, D. C. E. (1944). **A War Dogs' Training School.**—*J. R. Army vet. Cps.* **15.** 42–44 & 57–62. **2590**

A general description is given of the management of a war dogs' training school, chiefly from the veterinary aspect, for a period of one year, from April, 1943, onwards. Intelligent dogs of the larger breeds, free from gun-shyness, aged nine months to four years, are accepted for training. 2,000 dogs have passed through the centre, there being 300–400 present at one time. The daily ration is 1½ lb. cooked meat and 1 lb. biscuits with some cooked vegetable. Fretting is the chief difficulty, but this is largely overcome by personal attention, and, after the first six weeks, a dog seldom causes anxiety. The various diseased conditions encountered are dealt with under 14 headings, comments being made on their incidence and treatment. On a uniform diet, hysteria caused little trouble; two outbreaks involving 50 and 90 dogs respectively occurred in December and January but only 2% of the dogs had recurrences.—D. N. SPRIGGS.

SOLTYS, M. A. (1944). **Veterinary Education in Poland.**—*Vet. J.* **100.** 80–83. **2591**

This is a concise summary of Polish veterinary history which cannot easily be condensed further. It deals with the teaching establishments, the first of which was founded in 1784 at Lwow, with the current (pre-war) curriculum and study requirements of candidates for positions in the State and municipal veterinary services, with facilities for research, and with veterinary publications.

It is noted that veterinary meat inspection is obligatory for every town with a population over 8,000. The activities of Polish veterinarians who have escaped from the Continent since 1939 are surveyed.—J. E.

CAMARA, A. DE LIMA. (1942). A evolução do ensino agrícola-veterinário no Brasil. [**The Development of Agricultural and Veterinary Education in Brazil**]. —*Bol. Minist. Agric., Rio de J.* **31.** No. 9. 17–23. **2592**

This is a short account of the history of agricultural and veterinary education in Brazil from the time of the Imperial Institute of Agriculture, founded in Bahia in 1877, to the present day. In the early days, the veterinary courses were given in the agricultural colleges and, with the exception of the veterinary college at Minas Gerais, agricultural and veterinary colleges are still combined.—MILLER WATSON.

REPORTS

CANADA. (1943). **Report of the Ontario Veterinary College, 1942.** [MCGILVRAY, C. D.] pp. 46. Toronto: Printer to the King's Most Excellent Majesty. [8vo]. **2593**

The work of the year ending 31st March, 1943, is reviewed. Fifty-seven students graduated and 167 were enrolled. The course extends over a period of five years, the final examinations for graduation being under the jurisdiction of the Senate of Toronto University who appoint the examiners.

Several special draft courses were provided during the year, including one for fur breeders and a refresher course for veterinarians. The latter comprised field diagnosis of SWINE ERYSIPELAS and the use of the rapid agglutination test, pig nutrition, diseases of poultry, CALF SCOURS and CALF PNEUMONIA, MASTITIS control work and intramammary methods of treatment, examination of horses for soundness, and autopsy methods.

In cattle, the main diseases seen were STERILITY, MASTITIS, CALF SCOURS, CALF PNEUMONIA, NECROTIC STOMATITIS, NUTRITIONAL DEFICIENCIES, PSEUDO-LEUCAEMIA, HYPOCALCAEMIA, ACETONAEMIA, PHOTOSENSITIZATION, SWEET CLOVER POISONING, and RETAINED PLACENTA. In pigs, most of the usual diseases except SWINE FEVER were encountered, including an outbreak of avian type TUBERCULOSIS.

STOMACH-WORM INFESTATIONS were the main disorders of sheep, but PREGNANCY TOXAEMIA, "STIFF LAMB" DISEASE and NUTRITIONAL DISORDERS were also recorded. In fur-bearing animals, food TOXAEMIA was the main cause of loss.

Investigations included observations on HAEMORRHAGIC ENTERITIS in the arctic blue fox (due to the virus of feline enteritis), PNEUMONIA in pigs due to *Brucella bronchiseptica*, TRICHOMONIASIS, "IRON POISONING" in piglets (following the use of iron to prevent anaemia), VITAMIN A DEFICIENCY in pigs, the treatment of MALIGNANT WARTS by tissue vaccine (an autogenous tissue vaccine was successful in several cases), EQUINE INFECTIOUS ANAEMIA (SWAMP FEVER), and "STIFF LAMB" DISEASE (successfully treated by phosphoric acid).

In the poultry laboratory, PULLORUM DISEASE was present in 1,022 or 37% of all cases examined. COCCIDIOSIS occurred in 351 or 13% of cases. No cases of FOWL CHOLERA or of MYCOTIC DISEASES were recorded.

In the biological laboratory, brucella antigen and FOWL-POX vaccine were prepared and distributed and 52,738 blood samples were submitted to the agglutination test for BRUCELLOSIS; of these, 13,838 were positive and 1,873 were doubtful.—D. D. OGILVIE.

I. AUSTRALIA. SOUTH AUSTRALIA. (1940). **Report of the Stock and Brands Department for the year ending 30th June, 1940.** [LOXTON, C. A.] pp. 4. Adelaide: Govt. Printer. [fcp]. **2594**

II. AUSTRALIA. SOUTH AUSTRALIA. (1941). **Report of the Stock and Brands Department for the year ending 30th June, 1941.** [LOXTON, C. A.] pp. 4. Adelaide: Govt. Printer. [fcp]. **2595**

III. *AUSTRALIA. SOUTH AUSTRALIA. (1942). **Report of the Stock and Brands Department for the year ending 30th June, 1942.** [LOXTON, C. A.] pp. 3. Adelaide: Govt. Printer. [fcp]. **2596**

I. This report deals in very abbreviated form with the activities of the department and gives statistics for inspections of draught stallions, condemnations at abattoirs, and swine and cattle Compensation Acts. Activities on the control of the stickfast flea (*Echidno-*

phaga gallinacea) are briefly outlined ; an extension of the distribution of the flea to Port Augusta and Eyre Peninsula is recorded.

II. This report covers items similar to those listed above.

III. This report covers items similar to those listed above. JOHNE'S DISEASE is reported for the first time in this state.—H. McL. GORDON.

U.S.A. (1942). **Report of the Chief of the Bureau of Entomology and Plant Quarantine, 1941.** [ANNAND, P. N.] pp. 120. Items of veterinary interest pp. 91–95 & 98–104. Washington, D.C. : Superintendent of Documents. **2597**

U.S.A. (1942). **Report of the Chief of the Bureau of Entomology and Plant Quarantine, 1942.** [ANNAND, P. N.] pp. 60. Items of veterinary interest pp. 46–49, 51 & 52–53. Washington, D.C. : Superintendent of Documents. [8vo] [10 cents]. **2598**

Among the large amount of important information in these reports the following points are of particular veterinary interest. *Dermacentor variabilis*, the American dog tick, carrier of Rocky Mountain spotted fever, can be completely eradicated by twice weekly dippings of all dogs with a derris dip and by the poisoning of meadow mice which are the main host of the nymphs. From the excretion of blowfly larvae, have been isolated ammonium allantoinate, a healing agent for purulent wounds, and also " extract K ", which is of value in the treatment of osteomyelitis, and whose active principle can be cheaply synthesized. Concerning screwworms (*Cochliomyia americana*), it is stated that, as a result of long-term studies on the ecology and biology of this pest, it should be possible in Texas and adjoining states to prevent infestations and practically eradicate screwworms by co-ordinating certain ranching practices with seasonal and climatic factors which tend to destroy the insect. Biological investigations of the horn-fly, *Lyperosia irritans*, have shown that in feeding they take 1·7 mg. of blood per feed, a heavily infested herd of 500 animals losing collectively some 7 quarts of blood per day. When 1·5 g. of zinc oxide per 100 lb. of animal was fed, the growth of horn-fly larvae in cattle dung was inhibited. In experiments on the cattle louse, *Haematopinus eurysternus*, eradication was achieved by two dippings with cube + wettable sulphur. Of practical importance is the fact that the fluid left in the bath from the first dipping can be used for the second dipping some 21 days later.—J. B. CRAGG.

See also absts. **2426** (Department of Tsetse Research, Tanganyika), **2456** (Canadian Arctic Wild Life Enquiry).

BOOK REVIEWS

MERCHANT, I. A., & PACKER, R. A. [Department of Veterinary Hygiene, Iowa State College, Ames, Iowa]. (1944). **Handbook for the Etiology, Diagnosis and Control of Infectious Bovine Mastitis.** pp. iii + 66. Minneapolis, Minn. : Burgess Publishing Company. [8vo] [Mimeoprinted]. **2599**

In 66 pages the authors present a very clear review of the aetiology, diagnosis, and control of bovine mastitis. Chapters of this monograph are devoted to predisposing factors, the bacteriology of mastitis, and the diagnosis, control, and treatment of the condition.

This is a book more valuable to the student or practitioner than to the research worker. There is a good reference list of the previous ten years' American literature on mastitis, and technical details for indirect tests for mastitis are described.—D. L. ROBARTS.

MEEK, M. W. [LL.B., Member American Academy of Political and Social Science]. (1943). **Diseases and Parasites of Rabbits and their Control.** pp. 189. 51 figs. Montebello, Calif. : Reliable Fur Industries. [3rd Edit.] [8vo] [$ 2·50]. **2600**

The author has collected in this book a great deal of information on the diseases of the rabbit and large sections of the book consist of articles taken from other authors. After a preliminary explanatory section, various sections deal systematically with the diseases of the rabbit and are followed by a section on infectious diseases, a section on nutritional deficiencies, and finally a section on the medicines and wild plants which it is suggested may be used in the treatment of rabbit diseases. The author states that the " treatise makes no pretense as a scientific publication for veterinarians, but is written from the standpoint of the rabbit man ", but it is impossible to read the book without feeling that this purpose would have been better served by a careful critical analysis of the writings of other authors rather than by the method of wholesale quotation from them which has been employed. Frequent typographical errors mar the text and there are also a number of errors of fact. For example on page 63 in a quotation from another author it is stated that *Saccharomyces* excites " fermentation in the presence of saccharine ", and again on page 178 we are told that " camphophenique oil " is " used for keeping the wound free from asepsis ". On page 58 a diagram of the viscera of the rabbit gives a misleading picture of the small intestine and it is difficult to see why a description of intestinal disease due to *Giardia* should be followed by a description of intestinal disease caused by *Lamblia*, since *Giardia* and *Lamblia* are two names which have been given to the same organism. These examples indicate that the book needs careful revision and recasting before it can be recommended either to the veterinarian or to the rabbit keeper.—T. E. GIBSON.

O'HARA, D. [M.D., Professor of Preventive Medicine, Tufts College Medical School]. (1943). **Air-Borne Infection. Some Observations on its Decline.** pp. ix + 114. 9 charts, 1 map. New York : The Commonwealth Fund. [8vo]. [See also absts. 2579–2585]. **2601**

A study of the mortality rates obtained in Massachusetts in respect of diseases which are believed to be air-borne has shown that in 1917, 330 persons per 100,000 died, whereas at the present moment the figure has sunk to 100 per 100,000. This improvement can be credited in part to preventive medicine, particularly to those measures aimed at arresting air-borne infection, but other factors must be evoked since certain diseases were becoming less virulent, *e.g.* smallpox, before modern methods could have played a decisive part. The decline in the morbidity and severity of smallpox, diphtheria, whooping cough, influenzal conditions, pneumonia, streptococcal infections, and tuberculosis are discussed in detail. The view is advanced that as the virulence and incidence of respiratory infections decline, there is a greater tendency towards the elimination of the causes of these diseases : concurrently, natural resistance increases. Nevertheless, complete immunologic protection calls for exposure to disease which means that its cause cannot be eliminated with safety unless an artificial method of stimulating immunity is available.—R. E. GLOVER.

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